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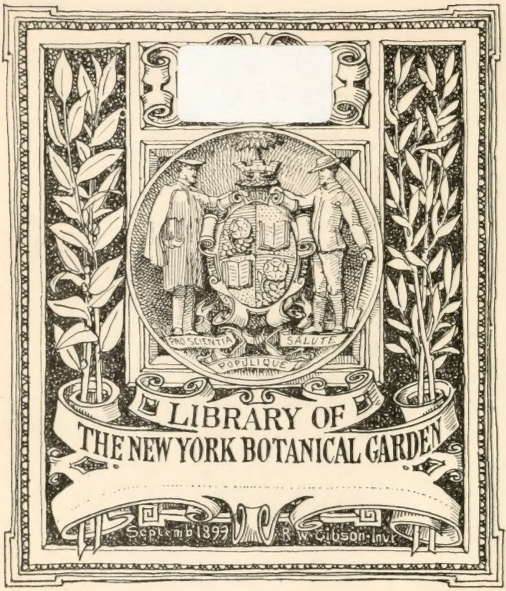
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Wilbraham.
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SEVENTH ANNUAL REPORT

OF THE

SECRETARY

OF THE

Massachusetts Board of Agriculture,

TOGETHER WITH

REPORTS OF COMMITTEES

APPOINTED TO VISIT THE COUNTY SOCIETIES,

WITH AN APPENDIX

CONTAINING AN ABSTRACT OF THE

FINANCES OF THE COUNTY SOCIETIES,

FOR

1859

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STATE BOARD OF AGRICULTURE.

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His Excellency NATHANIEL P. BANKS.
His Honor ELIPHALET TRASK.
Hon. OLIVER WARNER, *Secretary of the Commonwealth.*

APPOINTED BY THE GOVERNOR AND COUNCIL.

MARSHALL P. WILDER, *of Dorchester.*
WILLIAM S. CLARK, *of Amherst.*
EPHRAIM W. BULL, *of Concord.*

MEMBERS CHOSEN BY THE SOCIETIES.

Massachusetts,	RICHARD S. FAY, *of Boston.*
Essex,	GEORGE B. LORING, *of Salem.*
Middlesex,	SIMON BROWN, *of Concord.*
Middlesex, North,	JOHN C. BARTLETT, *of Chelmsford.*
Middlesex, South,	HENRY H. PETERS, *of Southborough.*
Worcester,	JOHN BROOKS, *of Princeton.*
Worcester, West,	FREEMAN WALKER, *of North Brookfield.*
Worcester, North,	JABEZ FISHER, *of Fitchburg.*
Worcester, South,	OLIVER C. FELTON, *of Brookfield.*
Hampshire, Franklin and Hampden,	PAOLI LATHROP, *of South Hadley.*
Hampshire,	LEVI STOCKBRIDGE, *of Hadley.*
Highland,	MATTHEW SMITH, *of Middlefield.*
Hampden,	GEORGE M. ATWATER, *of Springfield.*
Hampden, East,	CYRUS KNOX, *of Palmer.*
Franklin,	JAMES S. GRENNELL, *of Greenfield.*
Berkshire,	CHARLES K. TRACY, *of Hinsdale.*
Housatonic,	SAMUEL H. BUSHNELL, *of Sheffield.*
Norfolk,	CHARLES C. SEWALL, *of Medfield.*
Bristol,	NATHAN DURFEE, *of Fall River.*
Plymouth,	CHARLES G. DAVIS, *of Plymouth.*
Barnstable,	GEORGE MARSTON, *of Barnstable.*
Nantucket,	EDWARD W. GARDNER, *of Nantucket.*
Martha's Vineyard,	CHARLES B. ALLEN, *of West Tisbury.*

CHARLES L. FLINT, *Secretary.*

SEVENTH ANNUAL REPORT

OF THE

SECRETARY

OF THE

STATE BOARD OF AGRICULTURE.

To the Senate and House of Representatives of the Commonwealth of Massachusetts:—

The contract between the State Board of Agriculture and the Trustees of the State Reform School, by which the farm connected with the institution at Westborough was placed in charge of the former, having expired by limitation on the first of April, 1859, the labors of the Board there ceased on that date. The details of the management of the farm up to November 30, 1858, were given in my last Annual Report to the legislature, and as the operations from that time up to the expiration of the contract were naturally limited during the winter to the ordinary care of the stock, it seems unnecessary to dwell any farther upon them than to state that the closing up of the accounts of the farm will be found in the Appendix, to which reference is respectfully made.

The attention of the Board, during the past year, has been occupied chiefly in the collection of statistical and other information upon various subjects relating to agriculture, and the results of its investigations are embodied in the Reports of the committees to which special topics were assigned, which were presented and accepted at the annual meeting held at the State House, on the third of January, 1860.

The first was that of the committee, consisting of Messrs. Fisher, Brooks and White, who presented the following

REPORT

ON THE APPLICATION OF MANURES.

The undersigned were appointed by the Board at a meeting during the early part of the year 1859, as a committee for the purpose of considering and reporting upon the subject of the best depth of applying manures; that being one of eleven different subjects selected by the Board as appropriate for investigation. In pursuance of our instructions received at the time, we prepared a circular, with the expectation that the experiment therein contained, for the performance of which specific and detailed directions are given, might be tried by as many of the cultivators in the State as possible. We hoped that the combined result which might be arrived at in this way would be extremely valuable, as it would be really the first step taken in this particular direction towards obtaining reliable facts, through which we might ultimately be enabled to discover a principle; in other words, having discovered in part what nature *is*, we might be enabled to look through her up to her governing laws.

In the preparation of this circular we were guided by the following considerations: The real knowledge upon the subject in possession of the community is absolutely nothing. Even the most intelligent and observing men concerned in agricultural pursuits, when inquired of upon it, can give no opinion of any value, because such an opinion as they may cherish has not been attained through any actual experiment or knowledge, but is founded upon hearsay, or reasoning from analogy; the analogy itself being often uncertain or obscure. For two or three years past agricultural papers have been discussing the matter with a good degree of zeal, but without arriving at any thing in the way of a result, for the reason that although theories may be plausible enough, yet in the absence of facts to sustain them, they are worth comparatively nothing. Public opinion has drifted about with the wind and tide, and this theory or that has been alternately at the surface or in the subsoil, accord-

ing to the varying circumstances. One writer is in the habit of burying his manure deep, and he is convinced that it is the preferable plan, because he gets large crops, forgetting that there are a score of other conditions which influence the product more or less, any one of which might be judged by others to account for his large crops. Another applies his manure upon or very near the surface, and the result in his case is a satisfactory return. He forthwith proclaims this as the best mode, and he *knows* that it is so, because he has tried it. But what has he tried, pray?

He may have taken a piece of land of some particular quality, having certain characteristics of moisture and retentiveness of manures, which was manured and cropped in a certain way the year previously. This land he has ploughed to some fixed depth one or more times, and manured upon the surface. He has planted a certain crop, cultivated it in a certain way, during a certain succession of weather, and at the harvest he has a large return. Hence he reasons that if the manure had been applied six or eight inches deeper, the result would have been a failure to a greater or less extent, when perhaps an equal variation of almost any of the other circumstances or conditions would have produced the same variation in the product. But what kind of an experiment is this? Is it an experiment at all? Does it deserve the name? We might with almost equal propriety assert, that the particular amount of the gold harvest of California, during the year 1859, is directly attributable to the fact that Washington crossed the Delaware in the night. It is not difficult to imagine a connection, but how ridiculous to insist that these two facts shall stand out prominently, and that every other circumstance shall be lost sight of. And yet what is called experience among cultivators of the soil, is simply an aggregation of such experiments (!) in an individual's practice.

In this state of uncertainty, however, there are some general considerations which may be allowed to guide us, in so far as to indicate the course to be pursued in attaining the end for which we are seeking. Plants, like all living organisms, grow by the absorption and appropriation of nutritious substances from without. As a rule, animals travel in search of food, while vegetables remain stationary; though to some extent, by

the growth of their roots, they seek out such substances as are adapted to their nourishment. Hence it follows that in order to produce the best result in the production of any crop, the food intended for it should be so placed as to be at once and always available to the plants. To ascertain where this is, we must find the distance to which various plants send their roots in search of food. It may be enough for our present purpose to state, that the roots of all our commonly cultivated plants extend to, and interlace with, those of the neighboring plants, so that, practically, the whole ground is occupied with roots before the plants are fully grown. These roots are not made up of simply single, horizontal branches, but by their subdivision into rootlets and fibres, seek for nourishment upwards, downwards, and in all directions, more or less completely filling the ground from the immediate surface to a depth dependent upon the condition of the deeper soil. Hence it may be laid down as a rule universally applicable, everywhere, and under all circumstances, that the more thoroughly and intimately the plant food is diffused through and mixed with the soil, the greater will be the growth of any plant placed therein in a given time.

Here the question suggests itself, What is the food of plants? It is generally conceded that plants are incapable of taking up substances by their roots, unless such substances are in a state of solution. Plants may be said to drink, but never to eat. All their food is taken up dissolved in water, and until it is soluble in water it is not plant food. A manure heap, as we ordinarily find it, is a compound of the excrementitious matter of animals, mixed with straw. According to the investigations of Dr. Voelcker, chemist of the Royal Society of England, fresh manure of this kind contained nearly twelve per cent. of its dry matters in a soluble form. After six months' fermentation, the soluble matters had increased to upwards of twenty-one per cent. What we usually call manure, then, is only in part fitted for the nourishment of vegetable growth. As fast as it decomposes and becomes soluble, just so fast it becomes plant food.

Keeping these views in mind, we are now prepared to ask the question, how is manure to be applied to the land, in order to present its nutritious portions to plants in the most profitable

form? or rather, what is the most profitable mode of applying manure for the nourishment of plants? The first form of the question has already been answered in the rule laid down, that the more thoroughly and intimately the plant food is diffused through and mixed with the soil, the greater will be the growth of any plant placed therein, in a given time. This rule will not apply as an answer to the second form of the question, on account of the great labor and expense of thus thoroughly mixing the manure with the soil. None of the implements in common use will answer the purpose. The spade or fork is best adapted to this end, but in this country its use is attended with much too large an outlay and requires too much time. The cultivator and harrow are efficient, but act only superficially. The plough is well adapted to invert soil, but is a poor implement for mixing other substances with it. Digging machines are promising, but not as yet available.

There are in common use three ways of applying manure, and a fourth which has found favor to some extent. We refer to the broadcast application, believing that any other is but half a manuring, and not to be here considered. The first mode which we will examine is that of covering manure in to the full depth of a first ploughing. The argument for this is, that it is not buried so deep but that the roots find it readily, and that it being the nature of manure to *rise* in the soil, therefore at that depth the plants will be best supplied. Let us look at this argument for a moment. According to our rule before given, a layer of manurial matter buried deeply, is far from having its substance diffused through the soil, or mixed with it; and although it may be within reach of the roots, yet it can never encourage the formation of as *many* roots as if it were more distributed. It is generally considered that the thrift of a plant has a direct relation to the number of its roots.

Under what circumstances or in what sense can manures be said to rise or fall in the soil? It is evident that only the soluble and æriform constituents can change their position. The insoluble bulk of the manure must remain where it is first placed, until again disturbed by the plough or other implement. If the soil be saturated with water, as a consequence of rains, the soluble portions of the manure will be carried downwards, as the water percolates in that direction by the force of gravitation,

into soil that the plough has not moved, but really compacted, and to a considerable extent out of the reach of plants; thus being wasted. If, on the other hand, there is a continued drought, the moisture of the deeper soil rises to replace that which has been evaporated during the day, and carries with it such portions of the manure as have become soluble. It would seem that this latter action must necessarily be much less in amount than the former, though if continued for a length of time it would become considerable. Most of the gaseous compounds formed in the decomposition of manure would, by their specific gravity, tend to ascend, but they are generally soluble in water; and ammonia, one of the most valuable, is not only dissolved by water, but absorbed and retained by either carbon or alumina, more or less of one of which are to be found in all fertile soils; so that before this gas could have made much progress in an upward direction, it would be arrested by one of these agents.

The second mode of manuring to be considered is that where the manure is buried to about half the depth of the first ploughing. This is usually done by a small plough running across the furrows made by the first ploughing. The argument for this depth is, that although the staple of the manure is no more diffused through the soil than it was in the other case, yet by the frequent rains, the soluble matters are carried downwards, and during dry weather the movement of the same soluble matters is upwards; and as they both take place in that part of the soil which has been moved by the plough, the plant food really becomes more or less diffused throughout the space occupied by the roots of the growing plants.

In the third method, the manure is spread upon the surface and worked in, either with a harrow, cultivator, or brush. None of these implements cover it to any great depth, but give each separate portion of the manure a thin coating of loam. The reason urged for this practice is, that by far the greatest portion of the soluble parts of the manure are diffused through the soil by rains, and by the thorough mixing of the manure with the surface soil, the soluble matters will be carried down by every shower in a more perfect manner than can be attained in any other disposition of it. The argument against it is, that although it may do well in a wet season, yet in a dry one the

manure would be of comparatively little use, and even in a wet one there is much loss of ammonia and other gases, in consequence of its near approach to the surface, and partial exposure.

The last mode to be noticed, and one to which public attention has but lately been directed, is, what is termed the surface application of manures. Solitary experiments performed here and there, have seemed to point to this as being worthy of examination. The Hon. Charles B. Calvert, of Maryland, after a series of experiments conducted for the purpose of ascertaining the best method, now applies his stable manures upon the surface. The arguments for and against this practice have been mainly considered in connection with the previous methods, but in answer to the arguments against this plan, it is advocated that no appreciable amount of ammonia, or other valuable constituents of the manure are lost. This view gains importance from the conclusions arrived at by Dr. Voelcker before mentioned, who asserts that it is only during fermentation that free ammonia is formed, and the effect of spreading manure is to suspend the fermentation, and of course the evolution of ammonia. He remarks, that, "in the case of clay soils, I have no hesitation to say the manure may be spread even six months before it is ploughed in, without losing any appreciable quantity of manuring matters." These, however, are but deductions from the analysis of manures, and may or may not be borne out by experiment. It is also claimed by the advocates of this process, that the effect of the manure as a mulch, when applied upon the surface, will more than outweigh any supposed loss of valuable constituents in consequence of exposure.

Looking at this mass of conflicting practice and opinion, we endeavored to institute such an experiment as would, if extensively tried, put it in our power to make some deductions, showing at least in what direction the truth was to be found. After having carefully weighed the whole subject, we determined upon the form which follows.

Sir:—The Massachusetts State Board of Agriculture desire information upon the subject of the proper depth of applying manures, and submit the following:—

One of the greatest obstacles in the way of agricultural progress is the difficulty of obtaining reliable facts and statistics as a basis upon which to establish principles and construct theories. As a general rule

theories are first advanced, and then isolated facts are brought forward for the purpose of proving their truthfulness. It is true, that agriculture is not, in the usual sense of the term, and probably never will become, one of the exact sciences; yet there are many things connected with it which ought to be taken out of the region of conjecture, and placed, by repeated and multiplied experiment, upon a more substantial basis. A single fact or experiment may be of only trifling value in itself considered, but when added to scores or hundreds of others, the whole collectively may elucidate a doubtful point, or settle a vexed question.

With these considerations in view, we ask the attention of every cultivator into whose hands this circular may fall, that if disposed to render any aid in the solution of the question here considered, he may act in concert with hundreds of others all over the State, in such a way as to give to the result the greatest possible practical and scientific value.

It is proposed to ascertain and determine, if possible, at what depth it is best to place various manures and fertilizers, on the different soils of our State, upon which are grown any of the staple crops.

To accomplish this end we wish to call your attention to the following directions for performing the experiment in a thorough and satisfactory manner.

Select a level piece of land of any convenient size, from five square rods up to as many acres or more, which should be as nearly equal in its character and conditions as possible. Divide it into five equal parts, numbering them 1, 2, 3, 4 and 5.

Divide the manure which it is proposed to apply, and which should be of a uniform character, into four equal parts. At the time of first ploughing in the spring, spread evenly one-fourth of the manure upon plot No. 1, and then plough the whole field of an equal depth. Apply another fourth part of the manure to plot No. 2, and then cross-plough the whole field to about half the depth of the first ploughing. Spread another fourth of the manure upon plot No. 3, and harrow or cultivate the whole field; after which sow or plant the whole evenly with any crop preferred. Finally, spread the remaining quarter part of the manure upon plot No. 4.

Observe that by pursuing this course, each of the five lots will receive equally, a deep ploughing, a shallow ploughing, and a harrowing or cultivating, the only difference in them being that in No. 1 the manure is buried deep, in No. 2 shallow, in No. 3 buried only slightly, but coated with loam, and in No. 4 left exposed upon the surface; while No. 5 gets no manure. The manure is to be spread broadcast and as evenly as possible. The after cultivation should be the same on each of the lots, and the harvest of each should take place at the same time.

Brief answers to each of the following questions should be inserted, and this circular sent to Charles L. Flint, Secretary of the Board of Agriculture, Boston, Mass., on or before the 15th of November next.

1. Is the soil a light or heavy one?
2. Is it dry or moist in its general character?
3. Is it leachy or retentive of manures?
4. What was the crop of 1858?
5. What kind and how much manure was used in 1858?
6. What is the size of the field covered by this experiment?
7. How deep was the first ploughing?
8. What kind of manure or fertilizer was used, and how many bushels or pounds for the four lots?
9. What was the kind of crop?
10. When and how was it planted or sown?
11. How many times, and in what manner, was it cultivated?
12. When was the crop harvested?
13. What was the weight of grain, roots or other primary product on an average rod on plot No. 1?

Do. do. do. No. 2?
Do. do. do. No. 3?
Do. do. do. No. 4?
Do. do. do. No. 5?

14. If there was a double product, as grain and straw, corn and stover, &c., what was the weight of the secondary product on plot No. 1?

Do. do. do. do. do. No. 2?
Do. do. do. do. do. No. 3?
Do. do. do. do. do. No. 4?
Do. do. do. do. do. No. 5?

If it is more convenient to weigh the whole crop instead of estimating it by an average rod, there will be no objection to such a course.

Please give a brief synopsis of the weather for each of the following months, by dividing each month into three parts, and using the terms dry, moist, and wet, to indicate the general character of the weather.

	FIRST THIRD.	MIDDLE THIRD.	LAST THIRD.
May,			
June,			
July,			
August,			
September,			

Inasmuch as all the results of an experiment of this character cannot be fully determined in a single season, it is desirable that the land thus

employed be reserved for further experiment, if the Board of Agriculture should consider it expedient to pursue the investigation during the next year.

JABEZ FISHER,
JOHN BROOKS,
JOSIAH WHITE,
Committee of the Board.

BOSTON, March 1, 1859.

As in the moral world, each individual should be held accountable only for his own deeds of good or evil, so in the natural world, each individual circumstance or condition should be entitled to, and should receive, only the credit due to the influence exerted by itself as such. If this principle is admitted, and we do not see how it is to be denied or controverted, an experiment in that department of vital chemistry which applies to the vegetable world to be of any value, must be conducted in such a way as to isolate, so to speak, the particular item under consideration, that the effects or results which follow may be referred directly to their specific causes. In inorganic chemistry there is no difficulty in doing this. A single experiment is often of equal value with a thousand, because all the surrounding conditions are perfectly known and controllable; but in agriculture the case is entirely different. Here the conditions are either inappreciable, or out of our power to control, and it is only by the aggregation of a large number of experiments, that we can obtain through an average result, an approximation to the exact relation between cause and effect.

It was thought that a careful performance of this experiment by a thousand or more of the best farmers in the State, would give results of such a character as to enable us to determine to a comparative certainty, the best depth of applying manures upon all the different soils which are to be found under cultivation, and what variations might be required by differences in the kind of manure used, the crop grown, the depth of ploughing, various meteorological conditions and other circumstances. Pains were taken to give the directions in such a way that the experiment should be readily comprehended and easily performed, and all the conditions of each individual experiment should be precisely the same throughout, except the particular depth at which the manure was to be applied; thus isolating

that item in such a way that the result should have a meaning that could be understood.

Two thousand of these circulars were printed, and probably fifteen hundred were actually distributed, mainly by the members of the Board themselves, in nearly every town in the State, those receiving them doing so under an implied pledge that they would undertake the experiment. By this course we expected returns in such number and of such a character, that we should be able to lay down some general principles for the guidance of cultivators in the future, and indicate under what peculiar circumstances of soil, manure, crop or weather, such principles were inapplicable, and what variation from them would be expedient. For instance—

If we should find that out of a hundred persons cultivating corn on a light, porous soil, with barn cellar manure, ninety of them obtained the best crop from ploughing the manure in to the full depth, it would be an important result; but it would not do to deduce from that fact that manure for corn should be buried deep, as a rule, until we had ascertained the result of the same operation on heavy soil. If the crops on such soil should give the same proportion of success to the deep buried manure, then it might be safe to say that the indications were in favor of the general practice of placing manure deep for this crop. It is not safe, however, to jump at conclusions too quickly. Suppose, on examination, we should find that in all the one hundred and eighty cases, the season had been a dry one, and that in the remaining twenty, which were all in one general locality, there had been frequent rains throughout the growing season. We then might say, with much confidence, that barn cellar manure should be buried deep on all soils in dry seasons, and more shallow in wet ones. Suppose, on the other hand, that in the one hundred experiments in heavy soil, the best result should be attained by the surface application of the manure, while in the light soil the greatest crop was realized from that deepest placed. Then the principle to be deduced would be, that on light soils, barn cellar manure for corn should be applied deep, and on heavy soils, nearer the surface, or upon it.

The result of the experiments, as applied to the corn crop, might not agree with those upon roots, or small grains, and

very likely there would be differences dependent upon the kind or condition of the manure, weather, &c., &c.

The value of such multiplied experiments simultaneously performed, was anticipated as being of immense importance, and the result was looked forward to with great interest.

The time fixed upon for the return of the circulars was the fifteenth of November last. A meeting of the Board was called upon the 29th day of the same month, for the purpose, among others, of delivering to the various committees those circulars appertaining to their respective subjects, that they might be prepared to report at the January meeting. Upon receiving the circulars returned upon the subject of manures, we took pains to count them. We found that of the fifteen hundred distributed, there came back into our possession one, two, three, four, five, six, seven communications, one of which, however, proved to be not the return of the experiment, but only an opinion. Four-tenths of one per cent. of the distribution, and about one experiment for every fifty-six towns! This, it is to be understood, did not occur in benighted Africa, nor among the ignorant peasantry of Europe, but in good old Massachusetts, among the intelligent yeomanry, as politicians delight to call them; this land of free schools, and in this enlightened nineteenth century. Tell us no longer that the farmers of this Commonwealth are wide awake to every thing that concerns their interests or pursuits. Tell us no longer that an agricultural college is indispensable for the enlightenment of the farmers, but rather point out the necessity of infant schools, in which the A B C of the science and art of cultivating the soil may be taught and learned, where a real and abiding interest may be acquired in that pursuit which, in the words of the immortal father of our country, is the most healthful, the most useful, and the most noble employment of man.

In view of such a result we scarcely felt inclined to make any farther attempt of this kind. After what of our labor, time and pains we had spent in this work, to have all our bright anticipations of doing some slight service to our fellows thus dashed to the ground in consequence of an entire want of appreciation of the subject by the class for whose interest the matter was projected and carried forward, was, to say the least, extremely discouraging.

Although this attempt had thus proved a failure, yet there was left us one resource. The legislature of 1859, in sections 4 and 5 of chapter 232 of the laws of that year, authorized the Board to require the various agricultural societies receiving the bounty of the State to offer premiums from time to time, for agricultural experiments, to be conducted in such manner as the Board may direct, subject to the penalty of withholding the State bounty in case of con-compliance.

The Board, accordingly, on the first of December, authorized the issue of the following circular to the various agricultural societies:—

AGRICULTURAL DEPARTMENT, BOSTON,
December 5, 1859.

DEAR SIR,— At a meeting of the State Board of Agriculture, held on the 1st inst., it was

"*Voted*, That the several Agricultural Societies receiving the bounty of the State, be required to offer three premiums for the most thorough exact and reliable experiments upon the proper depth of applying manures, payable in the fall of 1862, as follows:—

"Select a level piece of land of any convenient size, from twenty square rods up to as many acres or more, which should be as nearly equal in its character and conditions as possible. Divide it into five equal parts, numbering them 1, 2, 3, 4 and 5, for a rotation of three years.

"Divide the manure which it is proposed to apply, and which should be of a uniform character, into four equal parts. At the time of first ploughing in the spring, spread evenly one-fourth of the manure upon plot No. 1, and then plough the whole field of an equal depth. Apply another fourth part of the manure to plot No. 2, and then cross-plough the whole field to about half the depth of the first ploughing. Spread another fourth of the manure upon plot No. 3, and harrow or cultivate the whole field; after which sow or plant the whole evenly, with any crop preferred. Finally, spread the remaining quarter part of the manure upon plot No. 4.

"Observe that by pursuing this course, each of the five lots will receive equally, a deep ploughing, a shallow ploughing, and a harrowing or cultivating, the only difference in them being that in No. 1 the manure is buried deep, in No. 2, shallow, in No. 3 buried only slightly, but coated with loam, and in No. 4 left exposed upon the surface; while No. 5 gets no manure. The manure is to be spread broadcast and as evenly as possible. The after cultivation should be the same on each of the lots, and the harvest of each should take place at the same time.

"Let a statement of the character of the soil, whether light or heavy, dry or moist, leachy or retentive of manures, the crop of 1859, kind and amount and mode of application of manure in 1859, size of field covered by the experiment, depth of first ploughing, kind and amount of manure used in 1860, kind of crop, when and how sown, number of times and manner cultivated, and weight of product on an average rod of each plot be made in 1860, and returned in the annual report of each society.

"If there is a double product, as grain and straw, corn and stover, let the weight of the secondary product be given on each plot.

"If the competitor weigh the whole crop, instead of estimating it by an average rod, there will be no objection to such a course.

"A brief synopsis of the weather for each of the following months, by dividing each month into three parts, and using the terms dry, moist, and wet, to indicate the general character of the weather, will also be expected.

	FIRST THIRD.	MIDDLE THIRD.	LAST THIRD.
May,			
June,			
July,			
August,			
September,			

"A similar report of all the above items, except the nature of the soil, will be made in 1861, and in 1862, when the premiums will be awarded. No manure is to be applied to the second and third crop."

"*Voted*, That the Secretary of the Board be requested to notify the several societies of the above as soon as convenient; and that the societies be requested to offer premiums which will secure an adequate compensation for the time and labor consumed in the experiment."

I hereby notify your society of the above vote. Evidence of a compliance with it will be required before I shall feel authorized to draw a certificate for the bounty to any society.

One of the greatest obstacles in the way of agricultural progress is the difficulty of obtaining reliable facts and statistics as a basis upon which to establish principles and construct theories. As a general rule, theories are first advanced, and then isolated facts are brought forward for the purpose of proving their truthfulness. It is true that agriculture is not, in the usual sense of the term, and probably never will become, one of the exact sciences; yet there are many things connected with it which ought to be taken out of the region of conjecture, and placed, by repeated and multiplied experiment, upon a more substantial basis. A single fact or experiment may be of only trifling value in itself considered, but when added to scores or hundreds of others, the whole collectively may elucidate a doubtful point, or settle a vexed question.

With these considerations in view, the Board asks and requires the attention of every society in the State, to render any aid in the solution of the question here considered, and to act in concert with them, and with each other, in such a way as to give to the result the greatest possible practical and scientific value. I would suggest that the rotation be limited to corn, grain and grass.

Allow me to call your attention to the Act of 1859, ch. 232, sections 1, 2 and 3, and especially to sections 4 and 5, authorizing the Board to make the above requirement, and the penalty of a disregard of, or a failure to comply with it.

I would simply suggest that premiums of $25, $20, and $15, have been offered by some of the societies, and that it is desirable that no offers should be smaller than these amounts, as the object above indicated is to induce a multiplicity of experiments.

Very truly, your obedient servant,

CHARLES L. FLINT,

Secretary State Board of Agriculture.

To the Secretary of the Society.

It is confidently hoped and expected that this course will be the means of bringing out something valuable. Although the experiments may not be as numerous as is desirable, yet if each society returns but three, the aggregate will be sixty-nine, and the competition for a list of generous premiums will have a tendency to bring out a much larger number. If the rotation be confined to corn, grain and grass, as there suggested, the result will be of great value as far as it goes, and it may be better to obtain a certain, limited result, than one covering more ground, but less satisfactory and decisive.

It is very important that this experiment should be carried on for two or three years at least, as it is quite possible, under some circumstances, that that portion of the manure not appropriated by vegetation during the first season may be entirely available in subsequent years. It is important to ascertain whether if we get an inferior crop during the first year we have any more manurial capital on hand than if the first crop had been a very large one. It is very desirable, also, to know if it is a safe operation to apply manure to land hap-hazard, with the expectation that it will prove to be simply a deposit which will remain safe from appropriation or embezzlement until called for by a growing crop.

Such having been the results of the matter thus far, and such being its present position, it seems hardly worth while to make any analysis of, or allusion to the few returns we have received, as they are not of a character, when taken alone, to afford any assistance in determining any of the points under investigation. Justice, however, to those individuals who, amid the general apathy of the farming community, have taken the pains to follow out the wishes of the Board, demands that they should receive attention and the most honorable mention. Therefore without expressing an opinion, which would be unwarranted by the small number of experiments, we present in as condensed a form as possible, the simple facts.

Experiment No. 1, conducted by O. C. Felton, of Brookfield. Light, dry, sandy loam, but retentive of manures. Was cropped in 1858 with turnips, manured with 875 bushels of hog compost to the acre. First ploughing, seven inches deep. Crop was corn, manured with 1,120 bushels of manure, one-half green, from the barn cellar, and one-half from sheep. Suffered from drought from and after July 25th. The result, reducing the whole to decimals, and placing the product of the unmanured portion at 100, is as follows:—

Without manure,	100
Manure left on the surface,	115
harrowed in,	129
3½ inches deep,	131
7 " "	135

Experiment No. 2, conducted by L. B. Fish, of North Amherst. Light, dry soil, but retentive of manures. Was cropped in 1858 with clover without manure. First ploughing, eight inches deep. Crop was corn, manured with 533 bushels of long manure from the barn cellar, and 5½ bushels of ashes in the hill. Suffered none from drought.

Result.

Without manure,	100
Manure left on the surface,	141
harrowed in,	169
4 inches deep,	157
8 " "	198

Experiment No. 3, conducted by B. Hale, of Leominster. Heavy, moist, retentive soil. Cropped in 1858 with corn, manured with ten cords of compost to the acre. First ploughing, eight inches deep. Crop was spring wheat, manured with 400 bushels of green cow manure. Weather not given.

Result.

Without manure,	100
Manure left on the surface,	115
harrowed in,	169
4 inches deep,	200
8 " "	169

Experiment No. 4, conducted by W. B. Hosmer, of Leominster. Light, dry, leachy soil. Cropped in 1858, with Hungarian grass, manured with 200 bushels of cow manure. The crop was ploughed in. First ploughing, eight inches deep. Crop was corn, manured with 1,024 bushels of cow manure. Weather was dry through July and a large part of August.

Result.

Without manure,	100
Manure left on the surface,	207
harrowed in,	250
4 inches deep,	268
8 " "	414

Experiment No. 5, conducted by S. F. Marsh, of Sturbridge. Heavy, moist, retentive soil. Cropped in 1858 with hay without manure. First ploughing, seven inches deep. Crop was potatoes, manured with compost, but the amount not stated. Weather not given.

Result.

Without manure,	100
Manure left on the surface,	126
harrowed in,	127
3½ inches deep,	131
7 " "	122

Experiment No. 6, conducted by E. P. Spear, of North Amherst. Heavy, moist, retentive soil. Pastured in 1858. First ploughing, 10 inches deep. Crop was corn manured with 1,025 bushels of hog and stable manure, composted with ashes and plaster. The early part of the season was wet, and after the corn was up and hoed once, a great rain deluged it, and it remained under water nearly a week.

Result.

Without manure,	100
Manure left on the surface,	152
harrowed in,	128
5 inches deep,	118
10 " "	108

We have not given any of the secondary products, but it may be stated as a rule, that the proportions would not materially vary from those given above.

JABEZ FISHER,
JOHN BROOKS,
Committee.

The committee on the subject of Exhausted Pastures sent out the following circular :—

SIR.—The Massachusetts State Board of Agriculture desire information upon the subject of Exhausted Pasture Lands, and propose the following questions to the farmers of the State.

You would confer a favor and assist the cause of Agriculture, if you will take the pains to answer the questions, and to make such experiments or inquiries as may enable you to answer them more fully.

You will be kind enough to return your answers in the enclosed envelope, on or before November 15th, directed to Charles L. Flint, Secretary of the Board of Agriculture, Boston, Mass., with the name of the subject or subjects upon which you have answered, indorsed thereon.

1. Are your pasture lands in any degree exhausted?

2. State the amount of stock your pastures will carry at the present time.

3. State the amount the same pastures were capable of feeding twenty-five or forty years ago.

4. Are your pastures infested with small bushes?

5. What is the best mode of destroying them?

6. Does the same treatment answer for the destruction of all kinds of bushes?

7. Do you plough any of your pasture lands? and if so, what is your subsequent treatment and what are the results?

8. Do your pastures abound in stones, so as to render ploughing impracticable? and if so, what treatment do you propose?

9. Do you apply manures to your pastures? and if so, state the kinds, the quantities, the mode of application, and the results.

10. Do sheep, in your opinion, improve pasture lands? and if so, what kind of land is most improved by them?

11. Do sheep exterminate any injurious weeds or bushes from your pastures? and if so, mention the kind or kinds.

12. Does the shrub called laurel or lamb-kill, abound in your pastures? if so, what is the best mode of eradication?

13. Do you use plaster? if so, in what quantity per acre, at what season, on what kind of land, and with what results?

14. If you have used dry ashes, please state in what quantities, your mode of application, the kind of soil, and the result?

15. Please state the same with regard to leached ashes.

16. Do your cattle remain in your pastures over night, or do you yard them?

17. Do your cows seek for bones and chew them?

18. At what time in spring do you turn your sheep to pasture?

19. At what time your cattle?

20. How late in autumn do your sheep remain at pasture?

21. Your cattle also?

22. Are your sheep or cattle suffered to roam over your pastures late in autumn and in winter?

23. Are your pasture lands all dry, or partly low and wet?

24. If wet, can they be improved by drainage?

25. If you have any plans for improving your pastures, or any suggestions to offer, please state them.

O. C. Felton,
Paoli Lathrop,
Wm. G. Lewis,
Committee of the Board.

Boston, March 1, 1859.

The above named committee presented the following

REPORT

ON THE RENOVATION OF EXHAUSTED PASTURES.

No subject connected with agriculture more especially demands investigation than the renovation of exhausted pasture lands.

The importance of the grass crop will be justly appreciated when it is remembered that no other crop equals it in value, not even the cotton crop of the South. It bears a similar relation to the other products of the farm that agriculture bears to the other interests and occupations of civilized communities. It is the basis of the farmer's success; it is his first, his continual and last dependence. His milk, butter, cheese, bread, meats, fruits, vegetables, the labor of his teams and his own labors, immediately or remotely, are derived from and sustained by his crops of grass.

It is a well known fact, that the pasture lands of nearly all New England are, in a great degree, exhausted of the substances most essential to the growth of those grasses which are alone suited to the production of bone, muscle and milk. In short, that they are greatly impoverished, and that this is the result of constant and too close cropping, without adequate returns.

Pursuant to the action of the Board, about one thousand circulars, on the subject of exhausted pasture lands, were distributed, it is believed, to individuals in every town in the State, with the earnest request and the expressed or implied promise that they should be answered and returned to the Secretary by the 15th of November last. The circulars were distributed early in May, and up to the 29th of November only twenty-five had been returned, and these, with few exceptions, contained very meagre and unsatisfactory replies to the inquiries proposed; but as far as they extend, they concur very generally in support of the following facts and propositions:—

1. That the grazing lands of the State are greatly exhausted —feeding from one-sixth to three-sixths less stock than the same fed twenty-five to forty years ago.

2. That the causes of exhaustion are the continual taking from the soil without making suitable returns to it; the spontaneous growth of weeds and bushes, and an excess of water in a large proportion of such lands.

3. That to rid the soil of bushes, ploughing or taking them out by the roots with some other instrument, is the surest, if not the cheapest mode of eradication. That cutting twice a year for several consecutive years, and applying from one hundred to two hundred pounds of plaster per acre each year, will, on grounds where plaster operates favorably, destroy many kinds of bushes effectually; that sheep will exterminate several kinds of weeds and bushes, and that wet lands are, in all cases, improved by drainage.

4. That where stones abound, so as to render removal inexpedient, and ploughing impracticable, the bushes may be kept down by continual cutting and the use of plaster and ashes; but that in most cases it is better to devote such lands to the growth of wood and timber.

5. That plaster operates favorably on some upland soils, and that ashes, either leached or dry, improve most dry soils.

6. That sheep improve upland pastures for two to four years, as they exterminate weeds and briars, and drop their manure more evenly over the ground, than neat cattle; that pastures should not be fed too early in the spring, nor too late in the autumn, and that close feeding is always injurious to grazing lands.

7. That milch cows, kept in exhausted pastures, will often seek for bones, and chew them.

The above facts and propositions are the result of our inquiries by means of circulars, on the subject of exhausted pasture lands, and it seems that nothing new has been elicited, nothing which was not well known before, and which is not confirmed by the constant experience of all observing owners and occupants of grazing lands every where in the State.

In the judgment of the committee, the modes of reclamation suggested, though in a degree effective, are quite inadequate to the purpose.

It is known to all who have investigated this subject, that all pastures which have been constantly and closely cropped for

many years, without receiving suitable returns, must of necessity be greatly exhausted of those substances which, in the economy of nature, are appropriated to the growth and support of bone and muscle, and to the production of milk; and that thorough renovation can be effected only by restoring those substances to the soil. Different modes of restoring these properties have been practiced, but it matters little how the effect is produced, provided it shall be thorough and at saving cost.

In every ten gallons of milk, there is about half a pound of bone earth; hence, a cow that gives twenty quarts of milk a day, takes from the soil about two pounds of phosphate of lime every week, and to restore this, three pounds of bone dust are required.

"Bone dust and sulphuric acid, mixed in equal parts by weight, and left until the acid has decomposed the substance of the bones," have been applied with satisfactory results. By this process, "the substances of which the bones are composed, are very minutely divided," and are thus "more readily taken up by the roots of the plants." This preparation may be conveniently applied by mixing it with plaster, loam, powdered charcoal, &c., or to this mixture may be added thirty times its bulk of water, and applied in a liquid state.

Bones are best suited to dry or well drained land, and may take the place of a part or the whole of the farm-yard manure. When thus used, it is well to combine them with wood ashes.

Ploughing exhausted pastures will be found of little avail—except to destroy weeds and bushes—without a suitable application of manure, as ploughing will restore nothing of which the soil has been deprived by long and close feeding. Manure, in suitable quantities, is indispensable, but any kind that will produce good crops of Timothy and clover, will answer the purpose.

It is the opinion of the committee, founded upon some experience, that old pastures may, in many instances, be renovated by turning them over smoothly, late in autumn, applying with the harrow a liberal quantity of manure in the spring, and seeding with Timothy, red-top and clover—with or without a crop of wheat, barley or other small grain. "If the season continues dry after the crop of grain has been removed, the young

plants will languish, and they must be protected from close feeding;" if the season should be wet, a heavy growth will follow, and admit of pasturing freely.

It may be and probably is a better and more thorough mode of operation, to plant with corn or potatoes the first year, and seed the next, applying a second dressing of manure. Both modes may be tested at pleasure.

The production of these grasses may be greatly promoted, and the latter, in moderate quantities, indefinitely continued, by occasionally top-dressing them with from one to two bushels of plaster per acre; or twenty-five bushels of wood ashes per acre, where plaster refuses to operate. Irrigation with slight manuring, in many places, produces favorable results.

The committee learn, both from experience and inquiry, that pastures devoted exclusively to the fattening of cattle, seldom deteriorate, clearly because they are not cropped to the extent of all they produce, and the cattle remain upon them both day and night.

The committee would suggest the following plan for the renovation of such pasture lands as may be ploughed.

Set apart four or five lots of convenient size; plough and plant No. 1 with corn, applying manure enough to produce a good crop. The next year sow the same with wheat or barley, and stock down to grass. Plant and treat No. 2 in the same manner, and so continue, planting one lot and stocking down one lot each year, until all are stocked down to grass. At the end of six years the five lots will have been completely renovated, and the same course commenced a second time. Thus the system may be indefinitely continued, yielding an unbroken succession of remunerating grain crops and pasturage of the finest quality.

In a single instance which came to the notice of one of the committee, the quantity of grass produced by this mode of culture was, he believes, nearly quadrupled, while the quality was improved in a much greater ratio.

The committee are aware that many experienced cultivators, whose opinions are entitled to the highest respect, are strongly opposed to the practice of pasturing renovated lands until the third year after seeding; and they seriously question whether any advantage results from ploughing such lands for the pur-

pose of renovation. It is hoped that valuable information will be derived from the experiment on the application of manures, which will probably be made by the county societies under the direction of this board.

If it should be proved by the proposed experiment that manures applied to the surface are of equal efficacy with those harrowed or ploughed in, and thus incorporated with the soil, then the plan above suggested may readily give place to the system of surface manuring.

The returned circulars show a large fraction of the pasture lands of the State to be wet, cold, and almost valueless; and they concur in the opinion that such lands may be improved by drainage.

The committee have not the means of estimating the wet portions accurately, but think they comprise at least one-fifth of the whole. In seasons of drought, the owners are obliged to rely almost entirely upon the crude and unsavory herbage of the wet portions of their pastures for the subsistence of their stock; hence the great importance of their thorough renovation.

"In every town in the State there are extensive bogs and wet meadows into which the surrounding hills have, for centuries, been pouring their fertilizing elements," but by reason of an excess of water, are almost worthless; but thorough drainage and moderate manuring have, in many instances, converted them into some of the most productive mowing lands in the State.

Experience has shown, also, that wet grazing lands are as much improved by drainage and manuring as the wet mowing lands which have been reclaimed from bogs and swamps, and that their productiveness and value are as greatly enhanced thereby.

Drains are variously constructed, according to the views and means of different individuals. Covered drains are most approved and are most convenient, especially on mowing lands and lands that are to be ploughed. Drains partly filled with small stones and covered, are the most common and cheapest where stones are abundant; but where stones cannot be conveniently obtained, drains constructed with sole tiles are said to be as cheap, as effectual, and as durable as any. On grazing lands, open drains, if properly constructed, are quite as effectual

and much cheaper than covered ones. The depth, width and location must vary according to the character of the soil and the situation of the land to be drained.

"Many and great advantages result from thorough drainage. It warms the soil, supplies air to the roots of plants, promotes absorption of fertilizing substances from the air," improves the quantity and quality of the crops, purifies the atmosphere and thereby promotes health, prolongs life, and greatly enhances the beauty and enlivens the prospect of the farmer's domain.

The committee would here close their report, by referring those who wish to examine the subject of drainage, to a somewhat elaborate article in the Patent Office Report of 1856, and to another, by a different author, in that of 1858, also to remarks of the Secretary of this Board, in his article on the grasses, in his Report of 1856, commencing at the bottom of page 232, and to a valuable treatise on farm drainage, by Henry F. French.

O. C. Felton,
W. G. Lewis,
Paoli Lathrop,
Committee.

The committee appointed to consider and report upon Cattle Husbandry, sent out the following circular:—

Sir,—The Massachusetts State Board of Agriculture desires information upon the subject of Cattle Husbandry, and proposes the following questions to the farmers of the State.

You would confer a favor and assist the cause of Agriculture, if you would take the pains to answer the questions, and to make such experiments or inquiries as may enable you to answer them more fully.

You will be kind enough to return your answers in the enclosed envelope, on or before November 15th, directed to Charles L. Flint, Secretary of the Board of Agriculture, Boston, Mass., with the name of the subject or subjects upon which you have answered, indorsed thereon.

1. What is the breed or grade of cattle mostly kept in your town?

2. Which breed is best adapted to your part of the State, taking into consideration beef, milk, and work?

3. Which breed is best for beef?

4. Which for milk?

5. Which for work?

6. At what age is it best to have heifers come in?

7. At what age should a valuable bull be put to service?

8. What is the best mode of treatment for a calf the first year?

9. By what rules are you guided in selecting breeding cattle?

10. What is the best mode of feeding cattle in winter?

11. What in summer?

12. How would you feed milch cows to obtain from them the most profit?

13. Have you any reliable rule for selecting cows for the dairy?

14. Have you any reliable rule for selecting cattle for the stall?

15. Have you ever tried any experiments in feeding cattle of any kind? if so, please state what and the result?

16. How long should a cow go dry before calving?

17. Is maturity of breeding animals essential to success in rearing first class stock?

18. What effect would poor keeping have on a breed of cattle after a few generations?

PAOLI LATHROP,
CHARLES K. TRACY,
JOHN BROOKS,
Committee of the Board.

BOSTON, March 1, 1859.

This committee, at the annual meeting, submitted the following

REPORT

ON CATTLE HUSBANDRY.

The committee regret to say, that of more than one thousand circulars sent out, soliciting information upon this subject, only seventeen have been returned with answers to the questions proposed. The committee regret this neglect of our farmers to aid in collecting much needed information. The State has expended a considerable sum of money, and the Board a larger amount in gratuitous labor, but they have failed to a much greater extent than they should have done, for the want of support from those for whose benefit the desired information was sought. We have gained some knowledge, and it becomes us to be thankful for a little and hope hereafter to get more.

The purpose of the Board, in propounding the questions contained in their circulars to the farmers on the subject of cattle husbandry was to ascertain, if possible, what portion of the State is best adapted to raising the various breeds of cattle, and the best practices in the different parts of the State in relation to cattle husbandry generally, and to diffuse the knowledge collected among our farmers through the report of the committee in the Secretary's Annual Report. To effect this purpose, the committee could devise, in their judgment, no better mode than to give the answers in the returned circulars substantially as they came from the authors, describing the location of the several towns in a manner that the public may readily perceive the section of the State in which they are situated. Given in this way, the public can judge better of their value than if a synopsis only was given, without affording a guide to the site of the town or section of country from which they came.

A distinguished gentleman writes, that the major part of the cattle raised in northern Berkshire are what are called native and a cross with the short-horns. About forty years ago an English bull was introduced by one of our best farmers. This bull was of a bright red color, and his stock was good. Crosses of the blood of this bull are visible in most of our farm yards, and are called natives. Some twenty years ago the short-horns were introduced, and there is now prevailing a cross from one-eighth to three-fourths of this blood owned by our best farmers.

A near cross with the short-horns I consider best and most profitable for beef. It makes the largest cattle grow rapidly and mature young. They need strong feed, require good pasture, and when that can be obtained there is no doubt of their superiority.

In my own experience, a cross of our native breed with the short-horns produces the best milkers. They are naturally of strong, vigorous constitutions; the calves grow up strong and healthy, laying a good foundation for a cow. Cows of this cross possess other qualities for milk, such as good shape, wide hips, large muscles, well developed udders, and large milk veins. I have a cow three-fourths of this short-horn. She is large, robust, gives at any time for six or eight months after calving, with good feed, forty-six pounds of milk daily, of good quality, and makes fourteen pounds of butter a week. Nearly

all of our best working oxen are a cross of the short-horns. They are larger, bear a greater burden, and are the most valuable. There are some Devon oxen that are beautiful cattle, spry and active, but much lighter; they are desirable for farm use.

The best age for heifers to come in depends upon how the calf has been raised. If it has had full feed and good care during the first year, they will come in much younger and do well. I had one come in at eighteen months which did well, developed well, and made a good milker. If well cared for, two years is as good an age as any. When they fail to do well, it is well to let them run one year farrow.

The most of our bulls are put to service at two years old; but if used much it will check their growth, and their development will be less perfect. During their growth they should be kept as quiet as possible, that they may lay a foundation for bone and muscle. The foundation for a good cow or ox should be made the first year. Calves should have constant good keep, and be made to grow thriftily, without check. They will then be robust, and well developed in all their parts, and come to maturity one year younger than with poor, ordinary keeping.

I have a heifer calf dropped in January last, three-fourths short-horn. I took the calf from the cow at two days old; set the milk of the cow twelve hours; skimmed it, warmed it, and added to it daily half a pint of meal, and fed the calf three months. In two weeks it would eat a good sized turnip daily; in four weeks it eat hay and was led to water, and at the end of three months was a large calf, and has continued to grow through the summer.

Good breeding cows should be healthy, robust, well developed in all their parts. Such cows will impart to their offspring the same qualities. I want broad hips, heavy quarters, slim neck and tail, and good milking qualities.

The requisite for cattle in winter is to tie them in warm, airy stables, so that they will be comfortable and contented. All fodder should be cut, particularly if you mix meal with it. Half a bushel of turnips daily to an ox or cow contributes to health and thrift and saving of hay. Cattle in good warm stables will consume one-third less food in winter than when

kept in the ordinary way, and will thrive as well as in summer, on grass.

The best provender for milch cows, I consider, is equal parts of oats, rye and Indian meal, four quarts a day, put on to cut hay or corn fodder, and half a bushel daily of carrots. With this keeping, a cow will give more milk in winter than by grass in summer.

In selecting cows for the dairy, the general appearance of the animals should be bright and active; they should have a good constitution, aided by good care when young; broad hips; slim, clean neck; bag broad when full; good sized teats, well set apart; bag extending well up behind; a yellow skin is most desirable. Cattle for the stall should be from three to five years old. A friend of mine, who stalled three hundred annually, always selected three-year-old steers as the most profitable. Snug-built animals are the best to fatten. Cows should go dry two months before calving. Maturity of breeding animals I do not consider essential. A well-developed two-year-old heifer will produce as good a calf as a mature cow, and perhaps better. Poor keeping will degenerate any class of animals. A good breed of cattle, with good feeding, will make the perfect ox or cow.

Another gentleman writes from a town in Berkshire County, about twenty miles south-west of Pittsfield, that most of the cattle in his town are crosses between the native, Hereford, Ayrshire, and short-horns. There are no pure breeds in this section, except a few short-horns that have lately been introduced. I have two heifers of this breed, three years old last spring, which I have milked two seasons, and they have more than met my expectations as milkers. They give a fair quantity and a good quality of milk, and seem to be well adapted to our climate, and to graze well upon our Berkshire hills. The oxen are well suited to the heavy work upon our farms, and when fat they occupy an important position in our markets. I think they combine more good qualities than any other breed, and are destined to supplant all breeds that have yet been introduced into this section of country. Heifers should come in at two years old, if you wish to obtain milking qualities. If they are intended for breeding only, perhaps it would be better they should come in at three years old.

A distinguished gentleman writes from a beautiful town a few miles west of Springfield, in Hampden County, that the prevailing breed of cattle in the town are native, but the cattle best adapted to that part of the State are grade short-horns for the purposes of beef, work and milk. The best for beef are Herefords and short-horns.

The best for milk are grade short-horns and native; for work, the Devons. Heifers should not come in until three years old. Bulls may be put to service at one and a half or two years old.

Young calves should have new milk until six weeks old; after that age, until three or four months old, skimmed milk, with oats and roots. In winter they should have warm stabling, with plenty of good hay and roots for food. For breeding cattle, I select those with fine heads, neck, and muzzle, bright eyes, round deep chest, broad hips, straight backs, showing a good constitution, clean limbs, and good handlers. Good hay is sufficient feed for cattle in winter, if given them twice in the morning and twice in the evening. If the hay is poor, it should be cut and mixed with cut or mashed vegetables. Feed four times a day, with the addition of corn fodder at noon. Cattle should be housed in warm stables, and their food supplied regularly.

Good pasture is sufficient feed for cattle in summer. Feeding milch cows to obtain the greatest profit, I would soil them if the farm would admit of it; if not, I would give them good pasture in summer, and in winter, good hay with plenty of roots, with corn fodder or cut feed at noon; while in the greatest flow of milk, two quarts of Indian meal or shorts should be given daily. Cows in milk should have warm, airy stables, and be well groomed daily.

In selecting cows for the dairy, I have have no infallible rule. I prefer those with clean heads and muzzles, bright eyes, small, slim necks, large udders, large milk veins, slim tail, fine limbs, thin thighs; always have reference to Guenon's treatise on milch cows.

When I select cattle for the stall, I observe the same rules as when selecting for breeding.

Cows should go dry three months before calving.

Maturity of breeding animals is essential.

Poor keeping destroys the value of the breed.

A very good farmer, residing in a town in Hampshire County, a few miles south-east of Northampton, informs us that the cattle in his town are all of mixed breed, and that the best breed for the purposes of beef, milk, and work are Durhams. For beef alone, the Durhams; but for milk alone, the native cattle are best. For work, he also prefers the natives or the mixed breed. Heifers should come in at two years old, and bulls may be put to service at the age of two years. Calves should be fed on grass and hay, milk and roots, the first year. I have no rule for selecting breeding cattle. The best mode of feeding cattle in winter is to give them such as you have, and the same in the summer. To make milch cows yield the most profit, he would give them plenty to eat. Has no reliable rule for selecting cows for the dairy, or cattle for the stall. Has tried no experiments in feeding, and thinks cows should go dry three months before calving. Maturity in breeding animals is essential, and on poor keeping cattle would deteriorate.

Another farmer, distinguished for cattle breeding, living in a town in Hampshire County, near Northampton, writes, that the Hereford is the prevailing breed in his neighborhood, and for purposes of beef, milk, and work they are the best. For beef and work only, the Herefords are best. For milk, the Durham breed is preferred. Heifers may come into the dairy at two years old, but should go farrow the year they are three. Bulls may be put to service at the age of eighteen months. The best treatment for calves the first year is to give them new milk two months, then skimmed milk with rye meal. My mode of feeding cattle in winter is to give them good hay four times a day.

When selecting breeding cattle, I regard size, shape, and fineness. The range of a good pasture is the best for cattle in summer. To obtain the greatest profit from milch cows, I would feed them in winter on hay and wheat shorts. I have no reliable rule for selecting cows for the dairy, or cattle for the stall. I have made no experiment in feeding. A cow should go dry two months before calving. Maturity of breeding animals is not essential. Poor keeping will deteriorate cattle.

The committee have replies from two farmers of celebrity, residing in the same town, in the south-westerly part of Worcester County. They agree that native cattle predominate in the town, but have some grades both of Devons and short-horns.

They also agree, that taking into consideration beef, milk, and work, the Devons are the breed best suited to that part of the State. For beef alone, one of these gentlemen says the Devons are best; the other makes no reply to this question. For milk, they both prefer the Devons for quality, and the natives for quantity. For work, they both choose Devons, being more active, hardy, and gentle. Both agree that heifers should come in at two years old, if of large size, and that bulls may be put to service at the age of two years.

One of these gentlemen thinks calves will do well on hay tea and skimmed milk until three months old; after that age good pasture, until stabled for winter; then good hay. The other believes they should have milk four months, then grass until winter, when they should have good hay and roots.

For breeding cattle one selects good milkers, which he remarks are in general loosely built. The other would select those that come of good milking cows.

In feeding cattle in winter, one begins with corn estover and poor hay, and finishes off with hay and meal. The other gives a variety of fodder with roots. They concur that the best summer feed is good pasture, with salt once a week. In answer to the question, How to feed cows to obtain from them the largest profit, one replies, Feed on cut hay, roots and shorts in winter. The other replies, Feed on good hay and meal in winter. Both agree that good pasture is the best feed for summer. Neither have any reliable rule for selecting cows for the dairy. One has no rule for selecting cattle for the stall; the other selects cattle with round, close made bodies and hardy constitutions. Both concur in the opinion that cows should go dry three months before calving, and they agree that maturity of breeding animals is essential, and that poor keeping will deteriorate any race of animals.

The committee have replies from two gentlemen residing in the same town on the easterly line of Worcester County. The answers to the questions are similar in both, and we give a synopsis, as follows:—

Most of the cattle in town are crosses between the natives, Ayrshires, Durhams, and Devons. The best cattle for beef, milk, and work, all things considered, are the Devons. The best working cattle are the Devons, they being the most docile,

active, and hardy. The best breed for beef is the Durham; for milk, the Ayrshires have the preference.

Two years is the best age for heifers to come in, but they should go dry the third summer. A bull may be put to service at two years, if large and vigorous.

The best mode of treatment for calves the first year is to allow two of them to suck the same cow. Milk, when sucked, is worth one-quarter to a half more than when drunk. At two months old begin gradually to feed on sweet hay and grass. In winter give good hay, with roots to promote health.

When selecting breeding cattle, I choose the female for internal organization, the male for physical development.

The best mode of feeding store cattle in winter is to tie them in warm stables, and feed one-half corn fodder, the remaining half may be hay, straw and roots. Corn fodder contains a large amount of nutriment, and is eaten by cattle with a good relish. For summer feed cattle should have a good pasture and a little meal.

Feeding milch cows to obtain the largest profit, I turn them in summer into good grass. In winter I feed steamed hay with one quart of Indian meal, and one quart of oil meal, morning and evening; soak the oil meal in cold water half an hour, then add your corn meal with warm water, making about six quarts for each cow. This is the best feed I have found. Selecting cows for the dairy, I prefer a pointed nose, thin, slender neck, light fore quarters, deep heavy flank and hind quarters, long crooked milk veins, a broad strip of hair growing upward behind from the teats, a slender, tapering tail, long coarse hair, a thin skin, and I am sure of a good cow. I am not a grazing farmer, and have no reliable rule for selecting cattle for feeding.

I have tried the experiment of feeding cows on steamed hay, and find hay well steamed will produce as much milk as the same quantity of dry hay with the addition of three pints of oil meal.

Cows should go dry two months before parturition.

Breeding animals should be mature and in their prime. The stock of old animals lose their hardihood and sprightliness. Cattle upon poor keeping will deteriorate and become worthless. Stock is kept good only by care and feed.

A distinguished farmer, residing in the north-east part of Worcester County, informs us that the cattle in his district of country are mostly of mixed and native breeds. The breeds best adapted to that part of the State for beef, milk and work, are the Durham and native. The Durhams, he writes, are best for beef, and the Durhams and Ayrshires are preferred for milk. Devons are the favorites for work.

Two years is the proper age for heifers to come in.

Bulls may be put to service at eighteen months old.

Calves should be allowed to run with a cow the first six months, and the remaining portion of the year should have for feed one quart of cob meal, or one quart of oats daily, and plenty of good hay.

Has no rule for selecting breeding cattle, and his mode of feeding cattle in winter is to feed five times a day, which he thinks the best. The feed should be good hay, and the cattle be housed in warm stables.

The best feed in summer is good pastures. If pastures fail, feed green clover, green oats, and green corn. I obtain the greatest profit in summer by feeding cows on good pasture; in winter, on plenty of good hay, with the addition of four quarts of Indian meal daily. I have no reliable rule for selecting cattle for the stall, or cows for the dairy. Have never tried experiments in feeding. Cows should go dry two or three months before calving. I cannot say whether maturity in breeding animals is essential or not. Any breed of cattle will deteriorate on poor keeping.

A large dairy farmer residing in a town near the middle of the west line of Worcester County, informs us that in his neighborhood the cattle are mostly grade Durhams, though there are some Devons and grade Devons. The best cattle, all things considered, are the Devon and their grades. For beef alone they are preferable, and for work better than any other breeds. Taking into account the cost of keeping, they yield the largest profit in the dairy.

The best age for heifers to come in is three years. Bulls may be put to service at two years of age.

Calves should suck ten weeks, then be weaned and turned upon a good pasture. The following winter their feed should be good hay and roots.

My guide for selecting breeding cattle is health and good development. The best mode of feeding cattle in winter is to give them hay and roots; in summer good pasture.

To feed cows for the greatest profit, I would give them good pasture in summer, and hay and roots in winter.

I have no rule for selecting cattle for the dairy.

In selecting for the stall I prefer Devons and grade Devons, and chose those of healthy appearance.

My experience in feeding cattle, taking cost of keeping into account, is, that Devons and grades of that breed give the greatest returns. Cows should go dry, on an average, two and one-half months before calving. Maturity of breeding animals is essential. Should judge that poor keeping would have a bad effect upon cattle, if continued for a long time.

Two prominent farmers residing in the same town, situate in the south-west corner of Worcester County, substantially agree in their answers. One of them replies that the prevailing breed of cattle in the town is native mixed with Devons. The breed best adapted to his section, for the purposes of beef, milk, and work, is the Devon crossed with Durhams. The Durhams make the most beef, but the Devons fatten more easily.

The Devons crossed with the natives are sought after for milk, but the native cattle are preferable for work.

If heifers are well fed they may come in at two years old; if not, three is a better age.

If bulls are to be kept until old, they should not be put to service before three years of age.

A calf will thrive much the best if allowed to suck the cow; but this is expensive, and I take them from the cows at three or four days old, and teach them to drink by nailing a teat of thick sole leather to the bottom of the trough, feeding them with new milk night and morning and skimmed milk at noon, until four weeks old, when I take them generally from the new milk and allow them skimmed milk with a little rye meal, until five months old, when I wean and turn to grass. In winter I feed on sweet hay and oats.

I have no special rule for selecting breeding cattle. I judge by their forms, and am partial to bright eyes.

I feed my cattle in winter regularly three times a day on hay, and occasionally for change, I give them corn fodder, or oat

straw; I feed to my milch cows turnips with a little Indian meal twice a day. Good pasture is best for summer feed. The most profitable manner of feeding cows in spring, fall and winter, is on good hay, with roots, corn and oatmeal; in summer, abundance of sweet pasture.

I have no reliable rule for selecting cows for the dairy, or cattle for the stall.

I have experimented on beef cattle, and consider boiled corn the best feed.

Cows should go dry six weeks, but if well fed may be milked up to within three or four weeks of the time of calving.

Maturity of breeding animals is essential.

Poor keeping will have a tendency to run out the breed.

A gentleman, many years distinguished for the interest he has taken in the cause of agriculture, writes from a town in Essex County, that nine-tenths of all the cattle kept in the town where he resides are of the old red stock of New England, and for beef, milk and work, this breed is the best for his part of the State.

For beef, the Durhams are reckoned to yield the most; the natives, the best. For milk, the Ayrshires and natives, and the grade stock produced by a cross of those breeds.

The native is the best breed for work. Heifers should come in between two and three years old. A bull may be put to service at two years old, but not before that age.

Full and generous feed should be allowed calves the first year, so that their growth may not be interrupted or stinted.

When selecting breeding cattle I am guided by observation. The countenance of the animals should be bright, lively, and expressive, and symmetry of form complete.

The best mode of keeping cattle in winter is to afford them comfortable stables, and a full supply of well cured hay, regularly distributed. Avoid laying before them more than they need the present hour. Cattle should be kept in summer in pastures of vigorous supply of grass and a full supply of pure water, and a sufficiency of shade trees for their comfort.

To obtain the greatest profit from milch cows, always keep them in good health and condition, with a free supply of pure air and plenty of good food. I have no rule for selecting cattle for the stall or dairy. Have tried no experiments in feeding

cattle. Cows should go dry about two months before parturition. Maturity of breeding animals I think essential. Poor keeping will reduce cattle to a worthless condition.

Three other circulars were returned, the answers in which were similar to those already given. For want of date, the committee could not identify the towns from whence they came. They therefore make no further mention of them.

The subject of cattle husbandry cannot be too closely studied by the farmers of Massachusetts. As an agricultural community, our improvement cannot be great, until the breeding and keeping of cattle is better understood and more universally practiced. We all know the exhausted condition of our lands, and the necessity of some practicable means of restoring them to their primitive fruitfulness. This can only be done by a plentiful supply of manure. We believe manure can be cheaply obtained by rearing a larger number of cattle and sheep. Spread them over our hills in summer, and furnish them with food from our valleys in winter, and they will produce fertilizing matter sufficient to renovate and keep the land in good condition. There is nothing lost. Changes take place; grass is changed into flesh, flesh again into grass. No animal can annihilate a particle of matter, but must return to the earth whatever it has received from it. This will be enough, and more than enough, to produce food for the support of another animal of the same size and kind.

Every bushel of Indian corn grown and consumed upon the soil will make more manure than enough to produce another bushel. We say more than enough, because during the growth of vegetation it is aided by gases from the atmosphere, and in the consumption of vegetables by animals something is added to the fertilizing power of the manure by the mysterious process of digestion in the animal organism. Thus we see that the products of the earth revolve in a circle, and like rural pleasures have no end.

Farmers need not want manure, if they will only apply their resources in the right direction. Winter and summer do not return with more certainty than the products of agricultural labor, if well and properly directed, and the improvement and renovation of our farms will certainly take place if we manage well the means within our reach.

We say, then, breed and raise cattle and sheep, or some other useful animals. Do not be discouraged if at first your means are small and your lands worn out. By economy and perseverance your means will enlarge and your land grow better, and in the end you will have the pleasure of success. Do not, however, be too sanguine. All that we recommend may be realized; but it cannot be done without care and labor. Cattle should not be bred and raised to be neglected and stinted of food, and thereby cheated of their fair proportions; but if you have poor, light land, accommodate your cattle to your land. Begin with those of small size, and no more in number than your farm will support at all times in the best condition. A small number well fed will return a profit; a large number stinted will insure a loss.

The first thing, then, to be looked to in commencing the breeding and raising of cattle, is the quantity and quality of the food your land will afford. If abundant and rich, select large cattle; if less abundant and poor, you must be content with small cattle. In other words, adapt your cattle to your farm and the food it will supply. We have five breeds of cattle which have proved to be well adapted to different sections of the State. The Durhams and Herefords are large and well suited to our rich valleys, where they can be supplied with abundance of rich food, and enjoy a comparatively mild climate. The natives, Devons, and Ayrshires are smaller, more hardy, and are well suited to the hilly and more mountainous districts of the State. The three last mentioned breeds are by no means unsuited to our rich valleys: but, whenever they can be well fed and enjoy a warm climate, they will afford as large returns in proportion to cost as other breeds. The different breeds of cattle are not all the best suited for the same purposes; and farmers in selecting breeding cattle should determine for what purpose they wish to breed. If for beef, the Durhams make the largest amount, and come to maturity early; the Herefords are next in size; they feed kindly, mix their beef well, but do not mature quite so early. The Devons are next in size, require less food, feed well, and make good beef.

If you wish to breed for milk, the Ayrshires having been bred exclusively for that purpose the last seventy or eighty years, are undoubtedly the best. They also, after leaving the dairy, fatten

easily and make excellent beef. But having been bred with a special view to milk, the oxen and steers do not mature for beef so early as some other breeds, though they feed easily, and when fat make excellent, well marbled beef.

Cattle known as natives are a mixed race, and it may be impossible, and is certainly a work of labor, to trace with accuracy their history. A very good account of them is given by C. E. Potter, in the Transactions of the New Hampshire Agricultural Society for 1854. Mr. Potter remarks:

"The first cattle brought into New Hampshire were imported by Captain John Mason, from Denmark, in 1631–2–3, and '4. There might have been a cow or two imported prior to that time, for the purpose of furnishing milk for the fishermen; but in those years Mason made frequent importations of bulls, oxen and cows, for the purpose of permanently stocking his manor of 'Mason Hall.'

"Now these Denmarks of Captain Mason, distributed through Maine, New Hampshire and Massachusetts, soon became mixed with the cattle that had been imported into the Plymouth and Massachusetts colonies, and which may be mainly called Devons —and formed that cross or breed of cattle denominated Natives. This cross predominates now throughout New England, though it has been qualified by importations of black cattle from the Spanish islands, and by a sprinkling of Durham blood. Our native cattle, then, at the present time, may be put down as grades of Devon, Denmark yellow, Spanish black, and a slight sprinkling of Durham. As before remarked, however, the Devons and Denmarks predominate, as is found by the large number of dark red, light red, and yellowish red cattle seen among the native cattle of New England. The yellow comes from the Denmarks imported by Captain Mason; and its mixture with the dark red of the cattle from Devonshire, accounts for the shades of dark and light red found among our native cattle. In fact, the characteristics of these Denmarks are everywhere seen in the large light red, or yellowish red cattle, with branching horns, long gaunt frames, powerful in the yoke, and when stalled, of extraordinary weight. Look at our exhibitions of working cattle throughout New England, or in the butchers' pens, and we shall find that the best cattle have some of the characteristics of these Denmarks—showing their descent with-

out mistake. We have often tried the experiment with some of our best cattle growers, and have never known it fail.

"The Denmark importation is what gives superiority to the working oxen of New England. It is true that there is a prejudice among farmers against yellow cattle; but it is one of fancy merely, for oxen of that color are generally of docile disposition, tractable, and always excelling in strength; in short, among the very best oxen upon our farms."

The native cattle described by Mr. Potter are a docile, hardy, active race, of good constitution. They feed slowly, but when fat make the very best of beef. The cows are good, some of them extraordinary milkers, and the oxen are held in high estimation for work.

After determining for what purpose you wish to breed, select your male, and in doing this spare no trouble or expense in obtaining a well bred, healthy animal. Few farmers seem to consider this of much consequence. They are apt to take any animal that happens to be in their neighborhood, often involving themselves in loss upon their stock by so doing; for a calf, even for veal, from a well-bred bull, is better than one from a scrub. The maxim in breeding is that like produces like, or that bodily shape and constitutional qualities of the offspring are in general similar to those of the parents, either combining in various proportions the qualities of both parents, or taking after one only. In most cases in cattle, however, the qualities of the male parent predominate in the offspring. And the advantage gained by selecting a healthy, strong, well-shaped, high bred bull for breeding, cannot be too highly appreciated.

What is meant by a high bred animal, is one whose ancestors, for many successive generations, have all been good, or have possessed characteristics in constitution and shape which experienced farmers wish to obtain in their stock. The family of such an animal will possess the qualities of their parents, while the offspring of an ill bred animal, or one whose ancestors have been crossed in every possible way, or have no distinctive marks, will present themselves in all the various shapes possessed by their ancestors. The offspring of a cross between two animals of high and low breeding, will most likely take after the best bred parent, and the common notion that the offspring of the first cross is the best, arises from the much more apparent

improvement in the first, than is likely to appear in any subsequent generation.

A very important consideration, and one that breeders of cattle must keep constantly in view, is that their stock should be healthy, and the first points to be considered when selecting cattle, are those by which we can form a correct judgment as to constitution. A wide, deep chest in all animals is an indication of robust constitution, and is, no doubt, the point of shape to which breeders should look when selecting either males or females. It is not enough that a bull or a cow should show a wide, full breast in front, but the width should extend back along the briskit, and show itself just under and between the elbows. Fullness through the region of the heart is indispensable in either sex. The general aspect of a bull should be masculine. This masculine appearance, even to the extent of a slight degree of coarseness, may not be objectionable. Bulls for the sire of feeding stock should have muscular necks, and a full muscle along each side of the back bone; the thigh should be full, the muscle extending nearly to the hoof; they should have a straight, level back, the ribs springing out in a horizontal direction, and gently curving into a round barrel shape, presenting a side view as near a parallelogram as possible.

One other point, and one never to be overlooked by dealers when purchasing cattle either for beef, work, or milk, is that they should be what is called good handlers; that is, possess a moderately thick, mellow, elastic skin. A good handler will invariably be in good health, have a good constitution, feed kindly, and fat rapidly. This mellowness of skin is due to the proper condition of the cellular tissue. The cells of this tissue are filled with fluid, and when pressed upon by the fingers, yield it to the adjoining cells, which immediately return it when the pressure is taken off, giving an elastic feel or touch to the skin. The cellular tissue is the receptacle for fat. The more abundantly it exists, the better an animal will handle, and the more fat will be formed. Small ears, quick and sensible to every new sound, small bones, and thick, fine soft hair, are all indications of aptitude to fatten. Cattle of a general coarse appearance, exhibiting a want of cellular tissue, or those which are bad handlers, will be found to possess large ears, coarse, wiry hair, and large bones, and will prove slow feeders. Whoever

undertakes to breed or fatten cattle with hope of success, must be well versed in the knowledge of buying and selling, and be able promptly to judge of all points indicating milking qualities, power and disposition for work, and aptitude to make a due proportion of bone, muscle and fat. This requires a quick, discerning eye, and a certain tact with the hand, which cannot be acquired without long practice and experience. After the possession of a good stock, cleanliness and regular distribution of food must be strictly attended to. Animals soon acquire a correct knowledge of time, and become uneasy unless precise hours are observed in feeding. They also acquire a knowledge of the usual quantity placed before them. After eating, they will quietly go to rest, but if stinted at any one meal, or if they do not get the usual allowance, they become restless and uneasy, and the repose and quiet arising from the certainty of receiving their food at regular intervals and in due measure, will be lost, and cannot be made up by a larger supply at a subsequent feeding, or at irregular intervals. The hours of feeding and quantity supplied should, therefore, be regular, and when once adopted should be punctually adhered to.

Fattening cattle in winter upon hay alone, is a resort of many farmers, and where hay is plenty and distant from market, the practice is not inconsistent with economy. If well attended, good animals consuming four per cent. of their live weight of good hay daily, will gain daily two pounds of flesh. Supposing the flesh gained to be worth sixteen cents, it will be equal to eight dollars the ton for the hay. The better practice, however, is to give only three per cent. of the live weight of the animal in hay daily, and an equivalent for the other one per cent. in Indian meal or roots. The gain would be greater for the same cost of food.

The best age for feeding cattle for beef, is from four to eight years. Young growing cattle may be fattened, but it will require more food in proportion, and longer time.

When looking for breeding cattle for the dairy, the maxim that like produces like should be observed, and the same indication of health and strength of constitution should be insisted upon as when selecting breeding cattle for the stalls. Some of their shapes, however, differ.

The general aspect of the dairy animal is thinner, sharper, and more angular than a feeding animal. When selecting dairy cows we should look for a wide chest, small head, wide between the horns and eyes, small muzzle, slim, thin neck, sweeping smoothly into the shoulders, the shoulders at the withers thin, back straight, hips wide, and wide in the pelvis, and deep in the flank, ribs a little flat, belly somewhat large, udder large, extending well up behind and well forward, her general appearance delicate and feminine; but, after all signs, the best recommendation a dairy cow can present, is a list of a long line of ancestors that have been famous for milk. Heifers may come in at two years old, but are enfeebled in health and constitution by the practice, and will not hold out in the dairy to so great an age as those that come in a year older.

The best dairy bull should have a broad, short head, horns spreading from the side a little in front, and turning upwards, back straight, a little sharp at the withers, widening backward to the hips, slightly sloping rump, belly large and legs short and fine, tail long and tapering, with a heavy brush of hair at the end. Much of the profit of a dairy cow depends upon a plentiful supply at all times of rich food. The variation in the quantity of milk they yield is principally owing to the difference in the nutritive quality of the food they receive. Cows receiving food poor in alimental matter, fall away in milk. Add to the nutritive properties of their food, and they immediately increase their flow. The quantity of milk then does not depend on giving a particular kind of food, but on giving a quantity equal to the support of the natural waste of the body, and leaving a remainder to be converted into milk.

Farmers err very much when they attempt to keep more cattle than they have means to sustain in the best condition, especially in winter. The result is, their cows come out of the stable in the spring weak and feeble, and struggle through half the summer before they are in condition to yield milk in quantity more than equal to paying expenses.

Dairy cows should be at all times in good condition. They should receive their food at regular intervals; their milk should be drawn at stated hours, and by quiet, kind, gentle milkmen; and they should be treated at all times with the utmost kindness. In short, every means in the power of the dairy farmer

should be used to insure their tranquillity. Harsh treatment exerts a very injurious action on the milk, rendering it less buttery, and more liable to acidity.

Respiration is a species of combustion. At every breath we inhale oxygen of the atmosphere, which unites with and consumes the carbon or fatty matter of the food. When cows are worried or driven too rapidly, they breathe more frequently, inhale more oxygen, and more of the buttery portion of their food is consumed, leaving less to be converted into butyraceous milk.

Warmth is a substitute, to a certain extent, for food. Cows, when warm and comfortable, will consume proportionally less food, and it is well known to all experienced dairymen, that their cows yield more milk in warm, pleasant days, or when they have the run of a warm, well sheltered pasture, than on cold rainy days, or when they run in cold, bleak pastures. When cold they inhale more oxygen; the result is a combustion of more of the carbon or oily part of the food, and less remains to supply the lacteal vessels with rich milk.

It is thought by some that the best mode of treating a calf the first year is the one most in accordance with his natural habits, and that is to allow him to run with the cow six months; then wean, and feed the next six months upon hay or grass, with roots, oatmeal, or gruel made of oil-cake, meal and water, or some other rich and suitable food. By this treatment, we get at one year of age a large thrifty calf, but unless full feed is continued, the animal at the end of three years will be slightly if any larger, and will cost more in proportion to value, than if a more economical course of feeding had been pursued. And even if full feed is provided until three years old, there may be a reasonable doubt whether the cost of the animal at that age will not bear a larger proportion to its value than if less expensive treatment had been adopted; in other words, whether an animal fed at all times up to its utmost capacity, will return so great a profit on cost as one fed more moderately, but at all times kept in good condition until the time arrives for fattening.

Milk is more valuable for other purposes than for feeding to calves, and few of our farmers can afford to allow the calves they rear for a future supply of stock, either to suck or drink full milk for more than three or four weeks; nor indeed is it

necessary. A calf at birth, or better at three or four days of age, can easily be taught to drink; and, if supplied from that time until four weeks old, the first twenty days with milk warm from the cow, and for the next ten days with cold full milk diluted with a little warm water and mixed with a quantity, at first, of rye or oil-cake meal, he will thrive well, and after four weeks will do well upon warm skimmed milk, with oats or oatmeal and a little hay. Gruel made of linseed oil-cake steeped in warm water, bears a close chemical resemblance to milk, and makes an excellent drink for calves at this age.

Milk being the natural food of the calf, he does not require when young that complicated arrangement of stomachs which becomes necessary for the proper division and preparation of his food when older. We accordingly find the passage to the first and second stomach closed, and the folds of the third adhering closely, leaving only a narrow tube for the passage of the milk to the fourth stomach, the true seat of digestion. This arrangement shows that the food of a young calf should be liquid. The time of change from liquid to dry or solid food with a calf is always critical, and weaning should take place gradually.

JOHN BROOKS.
CHARLES K. TRACY.
PAOLI LATHROP.

The committee appointed to consider and report upon the diseases of vegetation, prepared and sent out the following circular:—

Sir,—The Massachusetts State Board of Agriculture desires information upon the subject of Diseases of Vegetation, and proposes the following questions to the farmers of the State.

You would confer a favor and assist the cause of Agriculture, if you will take the pains to answer the questions, and to make such experiments or inquiries as may enable you to answer them fully.

You will be kind enough to return your answers in the inclosed envelope, on or before November 15th, directed to Charles L. Flint, Secretary of the Board of Agriculture, Boston, Mass., with the name of the subject or subjects upon which you have answered, indorsed thereon.

1. Do any of your cultivated crops, except potatoes, manifest indications of disease. If so, name the varieties?

2. Describe as minutely as possible the diseased appearance, commencing with the date of its first discovery, and note the changes which occur in its progress.

3. Has the diseased variety been long cultivated, or is it of recent introduction?

4. Is it a plant of slow or rapid growth?

5. What is the character of the soil in which it grew, and your method of cultivating it?

6. Is the extent of the disease sufficient to excite any immediate anxiety as to its effect upon the value of the crop?

7. Have you met with the same disease or diseases before, and if so, have they increased in extent?

8. Do any of your fruit trees exhibit symptoms of disease. If so, name them, and describe the diseased appearances?

9. Do such varieties of your trees as grow spontaneously in uncultivated ground show as much tendency to become diseased as those which are more carefully cultivated?

10. Have your trees, after being attacked by disease, recovered a healthy condition, or does the disease tend to the death of the tree?

11. Have you employed any special means to prevent or cure diseases of vegetation? If so, state what has been used, for what disease, and with what result?

12. Have you, by careful examination of the various parts of the unhealthy plant, as the root, the collar, the bark, the leaves, &c., been able to discover any insects which might have been the cause of the disease?

Special questions upon the potato:

1. What varieties of the potato do you cultivate?

2. How long have you known them?

3. Have any of them become diseased, and if so, which?

4. Please state your usual method of manuring and cultivation.

5. Have potatoes, manured in the hill upon your farm, been more liable to disease than those manured otherwise?

6. Have those to which you have applied barn cellar manure decayed more than those to which you applied other manures?

7. What manure has been followed by the least decay?

8. Other circumstances being the same, do you meet with diseased potatoes more often in moist land than in that which is dry?

JOHN C. BARTLETT,
WILLIAM G. LEWIS,
WILLIAM S. CLARK,
Committee of the Board.

BOSTON, March 1, 1859.

This committee, at the annual meeting, presented the following

REPORT

ON THE DISEASES OF VEGETATION.

The committee to whom was assigned the subject, "Diseases of Vegetation," have to regret, at the outset of their report, the limited degree of observation which exists among the farmers of our State. Of the observers upon this subject who answered the questions contained in our circular, not one has seen any indications of disease manifested in any vegetable, except the potato; and this, notwithstanding the universal blight which, two years since, passed over the *orange* carot, the fact of the increasing tendency to decay manifested by the different varieties of the turnip, the general complaint in the year 1858 of a softening of the parsnip, very similar to that described in the report of that year upon the potato disease.

Added to this should also be the fact that scarcely a field of beans can be found (of the longest cultivated varieties) in which marked symptoms of disease do not manifest themselves, first in the pod, and thence tending to immaturity of the fruit.

It is not the purpose of the committee, in this report, to enter upon the description and history of particular diseases, nor indeed do we suppose that most of the failures alluded to are to be considered as at present presenting much cause for anxiety, but as the tendency of all such evil is to increase until it shall eventually interfere seriously with the profits of the farmer, we feel it our duty to speak of the nature, causes and modes of investigating disease in a plain and simple manner, hoping to turn attention more generally and in a more rational manner to this subject, prospectively so important.

First, what is disease? If we ask this question of the uneducated mass of mankind, we get a thought like this, that disease is something of a tangible character, floating about in the atmosphere, ever seeking to break down and destroy life, and likely to be successful, unless violently torn out of the system by some counteracting process of cure, as the farmer, with his gunpowder and his iron bar, forces the rock from its earthy bed.

We are told that in the beginning God saw that every thing which he created was good. Reason teaches us that if any

meaning is attached to this expression, it is this, that every created thing was endowed with all the powers necessary to enable it to carry out, in the most perfect manner, the great purposes of its existence; to bear all necessary contact with other created things, without injury to its delicate organization, or in any way interfering with its vitality; and it is safe to assume that in this condition every living being was in health, and likely so to continue until the great object of reproduction was accomplished, and the vital actions should cease by their own natural laws, and life should pass into decomposition, that thus the parent should furnish a portion of the nourishment needed by its offspring. Every organic or living being has in reserve a degree of vital power, which nature never in its ordinary life calls into action, and by this reserved force it is enabled, to a certain extent, to meet what may be called the accidents of its existence, such as change of climate, mechanical injury, and change of food, and while this reserved force remains undiminished, vital action continues healthy. If health then consists in the natural action of the laws of life, it follows, of necessity, that disease, the opposite of health, must commence whenever the vital laws are interfered with, and cannot act without interruption.

We may say briefly, then, that disease is primarily deranged vital action, while the changes of organic structure which we *see*, are only the consequence of functional disease, which may have commenced and continued, with gradually accelerated force, through successive generations. Since, then, disease is only deranged action, and every living being is made up of different classes of organic action, the liability to disease, under ordinary circumstances, will depend very much upon the number of functions which are to be carried out by any given living being. Thus the higher classes of animals, if exposed to those changes in natural habit which disturb the harmony of action existing in their more complex organization, will be more liable to disease and to greater variety in the form, than those in which life is carried on in a more simple manner. If our reasoning is correct, the first step towards investigating disease will of course be to determine the different functions which make up the diseased subject. The least complicated form of vitality presented by the organic world, is to be found in plants, which

present only two great functions, viz., reproduction, as the great end of their existence, and nutrition, as the means by which reproduction is to be brought about. The apparent policy of nature in vegetable life is, that many varieties of plants shall grow together, so that each, by its debris, shall furnish something to the common stock of nutriment required by them all. Thus their vitality is maintained steadily without excitement or diminution, and generations appear and disappear in a natural and healthy manner, the soil in which they grow becoming more impregnated with nutriment as each variety decays, it seeming to be a fundamental principle of this successful cultivator, that the supply of food shall always exceed the demand. Thus her hand preserves that which was good in the beginning, in the same condition to the end. The cultivator of the soil, however, introduces into his process another principle which *nature* repudiates, viz., pecuniary recompense for his labor, and discovering that the condition which is good for the plant he cultivates, is not good for securing his great object, he sets up a process which we are in the habit of calling improvement by cultivation, which, while it enables him to go into the market under much better conditions, is directly injurious in the course of time to the plants under cultivation, and forces upon the farmer the necessity of a constant watchfulness to maintain by hybridization, changes of seed and rotation of crops, a remunerating business.

But what is cultivation? We have already alluded to the fact of a reserved vital force on the part of nature, and it is only by calling into action this reserved power, that a more vigorous vitality can be given to any plant, and to a certain extent, and for a limited period of time, this can be done, not only with impunity, but with decided advantage. But accelerated vitality must, in the course of years, wear very much upon the living machine to which it may be applied, and this acceleration is one of the chief elements of cultivation, its effects being first visible in the shortened life of the plant, the crop ripening earlier, and also manifesting a marked disposition to fail in the amount produced. The potato furnishes a good illustration of this statement.

But few years have elapsed since the farmer who failed to harvest at least two hundred bushels to the acre, would have

felt mortified at this result of his labor, while at this moment he would rather exult to secure half this amount. Many varieties of the potato, that generally known as the "long red," for instance, were never found to ripen in the ground, the vines being in full vigor until heavy frosts came upon them, while the tubers were unfit for the table until late spring, and even then but partially so. The same variety now presents its dead and dried stalks early in September, very rarely waiting for the lightest frost, while the farmer enters upon the work of harvesting with sad misgivings, lest disease should leave him too small a portion of his crop to remunerate him for his labor. It is essential to profitable cultivation that the different varieties of plants should be cultivated in distinct fields, while almost every part of them is removed from the soil, thus of course tending to a rapid exhaustion of the materials which nature takes so much pains to accumulate as food for her crops. The consequence is a necessary resort to artificial food, oftentimes of questionable composition, and so expensive as to make the profit of an increased crop very problematical. The condition of the cultivated plant being unnatural and subversive of its natural instincts, such changes must necessarily take place in its vital actions (its reserved quantum of life nearly exhausted by stimulation) as to make it extremely liable to become more or less disorganized whenever the proper exciting cause shall be made to act upon it, and those agents which, in its natural state, were intended as stimulants to vigorous health, may and often do become the direct agents in producing diseased action in the already enfeebled plant. Thus sudden atmospheric changes which, in the natural condition of the plant, would be decidedly beneficial to it, are often followed by the disorganization which first attracts attention, and is so generally attributed to mysterious miasmatic agents carried by the atmosphere, and still firmly believed to exist, although the most careful chemical research has failed to detect any indications of their presence. The nutritive functions of the plant having by ages of cultivation become perverted and diseased, it cannot be that those belonging more directly to reproduction should not suffer from the failing power of the organism which is entirely subservient to the propagation of the species. Consequently we have vastly overgrown or dwarfed fruits or vegetables, neither of which

ordinarily reproduce perfect specimens of their kind. It is a law of life that organized beings may be improved (if the term is allowable) only to a certain limit, and when that limit is reached, deterioration commences. Who has ever succeeded in propagating from the enormously overgrown animals, upon which the highest premiums are often improperly awarded, a progeny which has borne any relation to the size of the parents?

How many of the world's master minds have left behind them descendants which in natural powers have not fallen far away from the rank of their progenitors?

How many farmers, seeking to improve their crops by planting the seeds of unusually large specimens of the vegetable world, have met only with disappointment in the great reduction of the future crop? At the great exhibition of the industry of all nations, in London, a squash was exhibited weighing 250 pounds. Of this, a single seed was brought to this country, and its largest single result weighed less than 200 pounds. In the third generation the weight was about 150 pounds. A few seeds from this specimen came into the hands of the chairman of this committee, and the result of great effort and care was a single squash weighing less than twenty pounds; and the seeds obtained from this production, matured during the last season, two squashes, neither of which would equal in size some of the Baldwin apples which are frequently to be seen at our agricultural exhibitions. Errors in selecting seed have done much to propagate disease in the vegetable kingdom, it having been regarded as a universal rule that the largest and most perfectly developed specimens should be carefully reserved to furnish the seed for the next year's crop. Upon this point, it may be necessary to say a few words to prevent misunderstanding. To a partial extent, the rule is correct, if a proper consideration is given to all the circumstances of growth. I suppose every sensible farmer would be unwilling to attempt the improvement of his stock of cattle by the use of a male which had by very stimulating food, been forced to an unusually large growth, the progeny, if any were obtained, being far less likely to be of that healthy character which would make them acceptable to cattle growers, than if the sire was smaller but the animal more vigorous in health.

The apparent uniformity in the laws of life, so far as we can understand them, would indicate that in selecting the plants from which to propagate, we should avoid those raised under a highly stimulating method of cultivation, and as a general principle should reject those of unusually large growth, as being more likely to have exhausted their reserved vital force than those of more moderate growth; while at the same time those of a feeble and sickly habit should be equally cast aside, as requiring too much of the cultivator to be profitable.

A rule has generally obtained in New England in selecting the seed of Indian corn, to choose the largest and most perfectly developed twin ears. It may be a matter of some consequence to determine if this rule is quite as safe as has been commonly supposed. The chairman of the committee while investigating the potato rot, had occasion to visit a corn field of several acres, owned and cultivated by one of the best practical farmers in North Middlesex. Being struck with the very unusual thriftiness of the field, and the unusual number of twin ears, the question was asked how this result was produced. The answer was, "It results from the fact that no twin ears are ever saved for seed, my experience having convinced me that my corn deteriorated rapidly while I followed the old rule, and it has improved with equal rapidity, both in quantity and the quality of the crop, since I adopted the plan of selecting my seed from stalks bearing but a single ear."

The universal rule has also been to reject for planting the kernels upon the two ends of an ear of corn, and the proposition was received with some coldness, to test the value of this practice by an experiment on the State Farm, at Westborough. The result of that experiment, in connection with others made elsewhere, was to establish the fact that the apparently undeveloped kernels of the tip of the ear, gave the greatest weight of grain per acre.

Since the comparatively high price of the potato has compelled the farmer to more economy in its use, extensive experiments have been made upon the comparative value of very small tubers for seed, and the opinion, as far as inquiries have been made, seems to be general, that tubers of medium size are more likely to give a profitable return than those of a very large growth. There can be but little doubt that more attention to

the principles of hybridization would have resulted in more vigorous health in all our staple crops. But the practice of breeding in and in, in families, generation after generation, cannot have been otherwise than prejudicial.

It is, however, fortunate, that more attention is being paid to this subject, and the advantage of mixing seeds of the different varieties of the same plant is urging upon the public sentiment of the farming community the necessity of its more general adoption. In carrying out the present stimulating process of cultivation, it would be well also for the farmer to be governed somewhat by the capacity of the different crops to sustain vigorous life uninjured by its application. Experiments with guano clearly indicate that while some families of plants will bear its application in large quantities—as the cabbage and the most commonly cultivated grasses—others, as the potato and the turnip, fail very rapidly. A striking example of this effect upon the potato was afforded a few years since upon the State Farm, where the deterioration was very great, in the field planted for three successive years with the potato, and manured with an increased quantity of guano each year.

This consequence is probably brought about something in this way, and the difference in the capacity of different plants to bear stimulation is more apparent than real. The free application of manures highly charged with ammonia, stimulates the crop to which it is applied, and causes it to take up from the soil with more readiness the nutritive properties contained in it, or increases its appetite for food, as a small quantity of alcoholic liquors taken by man before eating, enables him to eat more freely and digest his food more easily. The increased quantity of nourishment, however, causes a necessity for a much greater expansion of leaves and stalks to cast off the refuse matter of the food and to imbibe more oxygen to vivify its nutritive matter. Hence all plants dressed with such manures, make a vastly increased quantity of leaf and stalk, and as one part of the living system cannot be over stimulated without eventually debilitating some other part, the increased vital force, directed to the parts above named, is in part diverted from the formation of perfect seeds; hence, those plants of which the leaf and stalk are the valuable portion to the farmer, *seem* to be improved by high cultivation,—as the grasses and

many others,—while those which depend upon seeds or tubers for their profit sooner manifest to the cultivator the necessity of a different system of cultivation.

This fact has been recognized by the farmer for many years, without, however, leading to the general understanding of its true explanation, for all cultivators have seen very highly manured potato fields giving but small results in tubers, because, to adopt the language in common use, they have run too much to stalk, while frequent complaint is made that turnips or carrots have not kept well, because the ground in which they grew was too rich. Rye, also, and oats, give a large yield of straw in proportion to the grain, in soil made very rich by manures.

The first question which comes up in the mind of the agriculturist, when disease invades his crop, is, how can it be cured? We answer that by simple medication, cure is never to be looked for.

The only process by which such a result can be brought about, is to remove the predisposing cause, the stimulating system of cultivation, by which the vitality, or, in common language, the constitution of the plant has been over worked. But as profit is the object of the farmer, we cannot afford to go back to nature's simple, and somewhat tedious process of cultivation, and at present the loss by disease is not commonly so extensive, except in the potato, as to make it to us a subject of great uneasiness.

If, however, any plan can be devised by which we can secure our seeds from more healthy parents, a great deal may be accomplished to save our successors in future generations from great loss. If it were possible for each farmer to plant a field which has been uncultivated for many years, in which nature has been at work to restore the previously exhausted elements of vegetable nutrition, and to apportion his various crops in such a field in the quantities necessary to furnish his seeds, and this process should be followed year after year, healthier seeds would be obtained, and would bear for a time the debilitating effects of high cultivation, without engendering deterioration; but, on the contrary, with improvement in the amount produced, avoiding always to propagate from stimulated crops, and the time must come when a proposition like this will force itself upon thinking men, if continued profit would be obtained.

We now proceed to speak of the proper method to be adopted in the investigation of disease. At present, if a crop fails, every sufferer from its effects starts up with a theory based upon a single fact which he may have observed, which sets at rest, in his mind, all necessity for farther examination, each theory in turn jostling its neighbor, and each destined to be overthrown by future experience.

Thus the ignorant man sees for the first time upon his plant an insect, which probably has always shown itself, but has escaped his observation, because his attention has not been drawn to it, and he examines no farther, but at once proclaims himself to the world as the discoverer of the "undoubted cause" of the disease. Another notices the access of disease consequent upon a sudden atmospheric change, and this satisfies him, while still another—his whole attention directed as a scientific man to certain obscure forms of vegetable life—finds a fungus growth which has heretofore been unnoticed, and he, like the others, rides his hobby into the midst of the battle, all equally forgeting that while each of their theories may, in particular instances, be correct, they only point to certain *exciting* causes, leaving still untouched the predisposing causes which alone are of great value in the formation of a true theory which may lead to important practical results. To investigate vegetable disease, then, it is important to examine it carefully in many different localities, to record at each examination every different appearance presented, the part of the plant affected, the character of the soil in which it grows, and the method of cultivation applied to it. The character of the season should also be fully considered, and no attempt to form a theory should be made until such an examination has been repeated in successive years. By pursuing this course, it will usually be found that some common cause has been acting upon all the plants affected, and at least an approximation to the truth may be obtained; while hastily formed theories only tend to mislead and blind the observer to many important facts, often quite as essential as those upon which the theory is based.

To give a practical application to what has been said upon the last topic, we would call the attention of orchardists to a disease of very malignant character, which may be found in many nurseries and young apple orchards, and which, if not

checked, will soon destroy many valuable trees. Its general prevalence is proved by the fact that every respondent to our questions upon diseases of fruit trees has described it, and all regard it as tending to the inevitable death of the tree. Its effects are manifested by a burned appearance of the bark appearing usually in the first instance, either at the junction of the scion with the stock, or at some point where a limb has been removed by the saw, or where the bark has been bruised by the plough or some other mechanical means; but wherever commencing, its course appears to be steady and rapid, until the tree dies. Upon removing the blackened bark, the wood is found to be dead beneath it, and sometimes, not always, a borer may be found beneath the bark and wood.

Theories of course abound in explanation of the diseased appearance, one calling it "frozen sap-blight," another attributing it to the effect of the sun's rays, others to grafting or injudicious trimming, others again to improper treatment in the nursery. Now we propose to all observers to cast all these theories behind them, and to enter upon the investigation in a manner something like the following:—

Take a given number of cases—the larger the better. Note carefully the part of the tree affected, and, if possible, the point of its commencement. Was it budded or grafted? Its age, as nearly as possible. The system of treatment applied to it in the nursery, and after its transplantation, should be recorded, as well as the character of the soil in which it grew. The period of the year in which trimming was performed, and the manner of operating, is an important point to be looked after, as well as the particular variety of the fruit. The diseased bark should be freely dissected, and the state of the wood recorded, and also if any worms are found, they should be carefully described in each case. Let every observer note whatever may be of any importance in his view connected with each diseased tree, and the results of each yearly observation be transmitted to the Secretary of this Board, that all such examinations may be compared together, and all the circumstances and symptoms classified.

If such a course as this could be followed for three successive years, all theory being carefully eschewed, we think it more

than likely that a sufficient number of circumstances would be found to be common to all the cases, to afford a rational explanation of the disease, and to point with tolerable precision to the treatment proper for its removal. Self-esteem, resulting from ignorance, excites in the minds of large numbers of men the hope of first crying "Eureka" in cases of this kind, and the pride of the individual and of his friends exults in the sensation which follows the first announcement in print of the name of the discoverer. We do not expect from persons under the controling influence of such feelings the necessary caution which alone can lead to reliable results. But clear minds enough exist among the farmers of New England, to carry on the investigation of vegetable disease with the care and patience required, and it is to be ardently desired that such minds should apply their energies to the work, that by a gradual accumulation of facts only, we may be able to see our way through the mists which now envelope the subject.

JOHN C. BARTLETT.
WM. G. LEWIS.
W. S. CLARK.

The committee on Fruits and Fruit Culture presented two Reports, one on General Fruit Culture, by M. P. WILDER, and one on the Culture of the Grape, by E. W. BULL.

REPORT

ON GENERAL FRUIT CULTURE.

Pomology as a science, in Massachusetts, and indeed in the United States, is yet in its infancy. We have but just entered the field which we are to cultivate, and have gathered a few first fruits of the bountiful harvest which encourages and is to reward our endeavors.

But, when we reflect upon the success which has attended the growth of particular fruits upon a few acres, under judicious cultivation,—upon the obstacles over which science and practical skill have already triumphed,—upon the industry, intelligence and enterprise of our fellow-citizens, which has been, and will continue to be, more and more devoted to this branch of terraculture,—upon the amount of land in our State

equally well adapted to fruit culture as that now appropriated to this purpose, and upon the ever increasing demand for fruits, we cannot doubt its future importance to the Commonwealth?

A moment's reflection upon the comparative value of our fruit crops, will convince us of the propriety of encouraging fruit culture. In 1845, the value of apples, pears, cherries and other fruits in this State is put down in our industrial statistics at $744,000; in 1855, at $1,315,000. At the same ratio of increase as in former years, it will amount in our next census to more than two millions of dollars, a sum greater than the combined crop of wheat, oats, rye and barley in the year 1855.

Our exports confirm this calculation. In the three autumnal months of 1858, and winter of 1859, there were about 120,000 barrels of apples exported from Boston, four-fifths of which were Baldwins. Our pear crop probably exceeds $100,000 per annum; and both of these are on the increase. The same is true of the strawberry and some other fruits.

When we consider the progress in pomology within our own recollection, the advancement of the arts of cultivation, the knowledge of the principles upon which those arts depend, and the interest awakened among all classes of society in the growth of fruits, we cannot but congratulate those who are just entering upon this inviting field, on the success which will surely reward their labors. And who can predict the blessings which this branch of industry will confer, as well on the poor as on the rich, and to the wealth and prosperity of the State?

The assembling of these rural comforts around the family mansion strengthens local attachments, multiplies the joys of home, sweetens the social relations of life, and promotes the love of kindred and of country. Fruits have too often been considered a luxury rather than a necessary of life. But, the more we use them, the more we shall approach a refined and healthful state both of body and of mind. It is, therefore, our duty, as guardians of the public weal, to develop these resources of our State, and to increase them to their utmost extent.

With this view, the State Board of Agriculture, at its meeting in the spring of 1859, appointed three of its members as a committee on fruits and fruit culture, and authorized them to issue the following circular:—

Sir.—The Massachusetts State Board of Agriculture desires information upon the subject of Fruit Culture, and proposes the following questions to the farmers of the State.

You will confer a favor and assist the cause of Agriculture, if you will take the pains to answer the questions, and to make such experiments or inquiries as may enable you to answer them fully.

You will be kind enough to return your answers in the inclosed envelope, on or before November 15th, directed to Charles L. Flint, Secretary of the Board of Agriculture, Boston, Mass., with the name of the subject or subjects upon which you have answered, indorsed thereon.

APPLES.

1. What are the best *six* and *twelve* varieties of the apple, for an orchard of fifty or one hundred trees, for family use?

2. What varieties of the apple are best for the market, and how many of each for an orchard of one hundred or one thousand trees?

3. What varieties of the apple do you consider most profitable for winter keeping or for shipping to other markets?

4. What do you regard as the best method for packing and keeping apples for winter use?

5. What is the character of the soil and aspect of the best orchards in your vicinity?

6. What distances do you plant apple trees asunder, and how many do you allow to the acre?

7. What do you consider the best method of preparing the ground for an orchard, and what the best sytem for its after-culture?

8. Has under-draining by tiles or otherwise been applied to your orchards? if so, with what effect?

9. Do you regard the ploughing of orchards beneficial or injurious to the trees?

10. Do you consider it profitable to cultivate in your orchards crops of any kind? if so, which are least injurious to the tree?

11. Has mulching been applied around your trees? if so, with what results?

12. What manures or fertilizers do you esteem best for an apple orchard? What quantity to the acre? What the best time and method of application?

13. What experience have you in raising new and choice varieties of the apple from seed? if any, state your method of obtaining such?

14. Have you any method by which apple trees, bearing only in alternate, may be made to produce every year?

15. Are the orchards in your section of the State attacked by birds, insects, or diseases? if so, what preventives or remedies have you for these evils?

16. What are the net profits per annum of the best orchards in your vicinity? state age, number of trees, varieties and quantity of fruit produced.

17. What has been the increase or decrease in the crop of apples produced in your vicinity since 1850?

PEARS.

1. What *six* and *twelve* varieties of the pear on pear stock are best for family use?

2. What varieties are best for the market, and what number of each for an orchard of 100 or 1,000 trees?

3. What varieties of the pear on the quince root do you consider the best for family use? What sorts best for a plantation of 100 or 1,000 trees?

4. In each of the above cases, please state the dates of maturity periods of gathering, and the qualities for keeping.

5. What do you regard as the best method for keeping pears for late fall or winter use?

6. What soil and aspect do you consider the most favorable for certain varieties, or for the productiveness and longevity of the pear tree?

7. What do you consider the best method of preparing the ground for an orchard of pear trees?

8. Do you consider under-draining advantageous to the pear tree, irrespective of the wetness and dryness of the soil?

9. What manures or fertilizers do you consider the best for pear trees? when and how should they be applied?

10. Have any of those substances an influence in forming fruit buds, or on the productiveness of the tree?

11. Have you applied mulching around your pear trees? if so, with what beneficial or injurious effects?

12. What experience have you in raising new and choice varieties of the pear from seed? if any, please state your method of obtaining such?

13. What is the average longevity of the pear tree, either on its own stock or on the quince root?

14. Which is the most profitable, an orchard of pear trees on their own, or on the quince stock? State the comparative value.

15. What has been the increase or decrease in the amount of pears produced in your vicinity since 1850?

PEACHES.

1. Designate the best *six* and *twelve* varieties of peaches, time of ripening, properties for keeping, and facility for transportation to market.

2. Have you ever originated any choice varieties from the pit or stone of the peach? if so, how do they compare as to hardiness and longevity with worked or budded varieties?

3. At what distance apart do you plant peach trees? What is the best season of the year for planting an orchard?

4. Which do you consider the best form, half standards or pyramids, for the peach tree? What is your system of pruning?

5. Are your peach trees attacked by the borer or other insects, by the yellows or other diseases? if so, what preventives or remedies have you for those injuries?

6. Do you attribute the non-bearing of the peach to extreme cold, or to sudden alternation of the temperature?

7. Can other crops be cultivated to advantage in a peach orchard? if so, what?

8. What is the average longevity of a healthy peach orchard?

9. What are the net profits of the best peach orchards in your vicinity, per acre?

10. What has been the increase or decrease in the amount of peaches produced in your vicinity since 1850?

CHERRIES, PLUMS AND QUINCES.

1. Please designate the varieties which succeed best with you, the character of the soils, system of management and value of the crop per acre?

STRAWBERRIES.

1. Designate the best varieties in regard to quality, productiveness—whether staminate, pistillate or hermaphrodite — with properties for keeping and facility for transportation.

2. What is the best method of preparing the soil for a strawberry plantation?

3. What soil and aspect do you consider best for the strawberry?

4. At what distance do you plant hermaphrodite plants apart?

5. At what distance do you plant staminate and pistillate plants apart, and what proportion of the former to the latter?

6. What season do you regard as the best for planting?

7. What manures or fertilizers do you recommend? when and how applied?

8. Have you produced any new varieties by cross impregnation of varieties? if so, describe method and success.

9. Have you practised irrigation or long continued watering of strawberry beds? if so, with what advantage?

10. Do you protect your strawberry beds in the winter with any covering? if so, with what material and with what advantage?

11. Is the forking up between the plants in spring or autumn, as practised by some, attended with beneficial or injurious effects?

12. What is the product of an acre of strawberries, at full bearing, of the most prolific sorts? What the value of the same?

13. What additional facts can you give in regard to the cultivation, and the best method of transportation, of this fruit to market?

RASPBERRIES AND BLACKBERRIES.

1. If the raspberry and blackberry are cultivated extensively in your section, please designate the best varieties, with the character of the soil, the system of cultivation, and the product per acre.

CURRANTS.

1. Designate the best varieties of currants?

2. What soil and aspect do you consider best for the currant?

3. What distance do you plant your bushes asunder, and how many plants per acre?

4. What is the average quantity of fruit per acre, at the age of five years?

5. What are the net profits of an acre, as above?

6. What amount of currant wine can be produced from an acre, as above?

7. What is the cost of making said wine per gallon, including sugar, and what is your method of manufacturing it?

8. Have you grown currant bushes in your orchards? if so, what are the advantages or disadvantages of such culture?

GRAPE CULTURE.

1. Please state what varieties you cultivate, and at what season they ripen.

2. What is the nature of the soil and subsoil; is it wet or dry?

3. What is the climate of your locality; heat, length of season, early and late frosts, exposure to winds?

4. What is your mode of cultivation? what depth of soil, kind of manure and quantity per acre? Do you train on poles or trellis? At what distance do you plant your vines?

5. What is the yield per vine, per rod, or per acre?

6. What diseases affect your vines, if any, and what remedies do you apply?

7. What kind of grape is best adapted to field culture in your locality?

8. If you make wine from grapes, please state how much you make, your mode of making it, and any other matter of interest in regard to it?

9. If you have a vineyard, please state your mode of culture in the vineyard, including training and pruning?

10. If you have any experience in raising seedling grapes, please communicate it?

11. Please state your mode of propagating vines, whether by layers, cuttings or eyes, and your opinion as to the best mode.

12. Please add any general remarks you may think of interest.

MARSHALL P. WILDER,
E. W. BULL,
NATHAN DURFEE,
Committee of the Board.

The returns in response to the foregoing circular have been less numerous, and some of those received were less full and explicit than was expected, while others realized the most sanguine expectations of your committee, evincing a careful and thorough investigation, much ripe experience, and results very satisfactory and important to the fruit culture of the Commonwealth.

These returns your committee have critically examined, and herewith annex the general purport of the replies to the questions proposed. The number of the answer, in each case, corresponds with that of the question in the circular, to which it responds.

ANSWERS TO INTERROGATORIES.

APPLES.

1. The *best six* are Baldwin, Rhode Island Greening, Porter, Roxbury Russet, Red Astrachan, Golden or Lyman Sweet.

The *best twelve* are Baldwin, Rhode Island Greening, Hubbardston Nonesuch, Large Yellow Bough, Porter, Williams' Favorite, Red Astrachan, Ladies' Sweet, Gravenstein, Roxbury Russet, Mother, Golden or Lyman Sweet.

2. For an orchard of 100 trees, 50 Baldwins, 25 Rhode Island Greening, 10 Roxbury Russet, 5 Hubbardston Nonesuch, 5 Porter, 5 Williams' Favorite. One cultivator in the western part of the State, says that for an orchard of one hundred trees, he would have all of them the Congress apple. (This is a large, handsome, red apple, ripening late in the autumn.)

For an orchard of 1,000 trees, 500 Baldwins, 200 Rhode Island Greening, 75 Hubbardston Nonesuch, 60 Roxbury Russet, 45 Porter, 25 Williams' Favorite, 20 Gravenstein, 20 Ladies'

Sweet, 20 Golden Russet, 15 Hunt's Russet, 15 Mother, 15 Red Astrachan. One return from Middlesex, gives as his list for one thousand trees, 600 Baldwin, 200 Hunt's Russet, 100 Hubbardston Nonesuch, 100 Gravenstein, 25 River, 50 Late Green Sweet, 10 Fall Pippin.

3. Baldwin, Rhode Island Greening, and Roxbury Russet.

One fruit grower in Middlesex, reports as best for "keeping and shipping," the Baldwin and Hunt's Russet.

4. One of the largest apple growers says: Packing in clean, tight flour barrels, and if wrapped in paper, will keep two or three months longer. One uses very dry leaves between the layers, another recommends saw dust and lime. The returns are various, but all concur in the necessity of packing dry and keeping cool.

5. The best orchards are on strong, rich, but not too sandy, loam.

6. Thirty feet each way; forty-nine to the acre.

7. In the preparation of the soil for an orchard: trenching or subsoiling the land, with a copious supply of manure; and if cultivated at all, only with some of the root crops, midway between the rows, for the first few years.

8. Draining uniformly advantageous, but not as yet, much attempted.

9. The ploughing of orchards always injurious, except when very shallow.

10. Most returns are in opposition to the cultivation of any additional crops; but, if any, only root crops.

11. Mulching generally favorable, especially in dry soils.

12. A liberal supply, annually, of any good stable or barnyard manure. Leached or unleached ashes are desirable—applied late in the autumn or early in the spring, at or near the surface.

13. None, in the production of new varieties from seed.

14. None.

15. The borer, lice, canker-worm, caterpillar, and apple-worm: remedy—for the first, immediate extrication; for the second, a weak alkaline wash; for the third, tarring on a strip of cloth around the trunk at the proper season, or by wooden or metallic protectors filled with tar diluted with oil, or some other liquid, to arrest the progress of the insect; for the fourth, removal and crushing, and for all these, high culture, and frequent stirring of the soil.

16. One of the most profitable crops of the farm.

17. The returns are conflicting in relation to the increase of crop. General opinion is in favor of an increase. One cultivator in Middlesex, says 50 per cent. since 1850.

PEARS.

1. The returns give as the *best six*, the Bartlett, Flemish Beauty, Seckel, Louise bonne de Jersey, Rostiezer, Winter Nelis or Vicar of Winkfield.

For the *best twelve*, Bartlett, Flemish Beauty, Seckel, Louise bonne de Jersey, Vicar of Winkfield, Beurre Diel, Rostiezer, Winter Nelis, Buffum, Beurré 'd Anjou, Lawrence, Beurré Giffard.

2. For market, Bartlett, Flemish Beauty, Beurré Bosc, Vicar of Winkfield, Fulton, Lawrence, Buffum, Louise bonne de Jersey, Winter Nelis.

For an orchard of an hundred trees on pear root, 30 Bartlett, 20 Flemish Beauty, 20 Louise bonne de Jersey, 15 Vicar of Winkfield, 10 Buffum, 5 Seckel.

3. For pears on the quince root, Louise bonne de Jersey, Duchesse d'Angouleme, Belle Lucrative, Flemish Beauty, Beurré d'Anjou, Vicar of Winkfield, Glout Morceau.

4. No return.

5. Gather carefully, and keep them closely barrelled or boxed, in a cool, dry cellar or fruit-room.

6. A sheltered aspect, in a deep, rich and mellow soil.

7. Thorough and deep trenching or subsoiling, similar to that for the apple, but richer.

8. Few experiments, but the results uniformly beneficial.

9. Same as for other fruit trees.

10. No general reply.

11. Mulching has been used with great advantage.

12. Hon. Asahel Foote, of Williamstown, says: "I commenced raising seedlings, with a view to originating new choice pears, in 1852, and have now growing, of different ages, some five hundred trees, selected from, perhaps, as many thousands, and grown from seeds of nearly all the standard sorts. Not only grafts from these seedlings, inserted into bearing trees, both standards and dwarfs, but some of the seedlings themselves, give promise of fruiting the next season. My system is

as follows: Desiring, for instance, to produce a new pear, which (as a whole, including tree and fruit,) shall combine the vigor, hardiness, productiveness, large size and fine appearance of the Flemish Beauty with the exquisite flavor of the Doyenne Gris, I insert into a thrifty, bearing tree of the former, a well-grown healthy scion of the latter, and thus bring the two varieties into the closest proximity to each other, for the purpose of effecting a cross between them by natural fertilization. As soon as this scion produces fruit, I select the best specimens, and at the proper season, (I prefer November,) sow the seeds in drills, in light, rich garden mould, in the same manner as for raising stocks. When the seedlings attain a sufficient size, which more or less of them do the first year, I take from them buds or scions, and insert them in bearing trees, for the purpose of speedily obtaining specimens,—taking the precaution always to make a memorandum of the connection between the bud or scion thus set, and the seedling from which it was taken, that, in case of its failure to grow, I may be able to replace it, and that also, in case of its producing a valuable fruit, I can identify and preserve the original tree. And to be able the more certainly to accomplish these several objects, I plant out all these subjects of my experiments in nursery rows, at such ample distances apart that they may remain until they attain to bearing, which event I endeavor to hasten by grafting each tree upon itself, at standard height. If any shall happen to produce a fruit of merit, it can be at once transferred to the orchard; if otherwise, it can remain in its place, and serve as a stock for the testing of other varieties."

13. No general reply.

14. The returns are generally from those who have the pear on its own stock.

15. Great increase. One cultivator reports fourfold. Another three times as many as in 1850.

PEACHES.

1. Mr. Moore, of Concord, says: "Early Crawford, Late Crawford, Poole's Yellow, Late Admirable, Jaques, Coolidge. They ripen in succession, beginning with the Coolidge, from the first of September to the fifth of October."

2. Those obtained from seed are considered superior to the budded varieties in hardiness and longevity.

3. From twelve to fifteen feet, spring.

4. Half standards and pyramids.

5. Borer and yellows. Remedy for the borer the same as in the apple—none for the yellows.

6. Replies not uniform. Some attribute the destruction to extreme cold; others to sudden changes of the temperature.

7. None, after the trees arrive at a bearing state.

8. In relation to duration or life of the peach tree,—returns various, from ten to twenty years.

9. From $150 to $200 per acre.

10. Season, for the last few years, very unpropitious.

CHERRIES, PLUMS, AND QUINCES.

1. The Black Eagle, Black Tartarian, and Downer's Late cherries, are of the first order; where these are tender, the Mazzards commonly flourish.

In most places the plum fails on account of the black wart and the curculio.

The Quince is a very profitable crop, where it is kept free from the borer. The orange or apple-quince, is considered the best.

STRAWBERRY.

This fruit is not much cultivated by our common farmers, who obtain their supply from those growing spontaneously in the open field. But it is largely grown by market gardeners. Hovey's Seedling, Jenny Lind, and Early Virginia, are the most popular sorts. All agree in the necessity of planting a proportion of male with the female varieties.

RASPBERRIES AND BLACKBERRIES.

These are not generally cultivated by farmers, but are grown extensively near large cities for the market. The Knevet's Giant and Franconia raspberries, and the Lawton or the Dorchester blackberry, are the most generally approved.

CURRANTS.

Those generally cultivated are the Red and White Dutch, both for family use and for the market.

GRAPE CULTURE.

The report on grape culture, is annexed to this document, as a special paper, by another member of the committee, eminently qualified to discharge that duty.

A glance at these returns will show their general conformity to the opinions of the most experienced fruit-growers in this Commonwealth, to the decisions of the Massachusetts Horticultural Society, and of the American Pomological Society.

These facts and deductions, elicited by the Circular of the Board, have impressed your committee with the expediency of subjoining the following suggestions in relation to fruit culture, or the best means of promoting this art in Massachusetts:—

I.—*Thorough Drainage and the proper Preparation of the Soil.*

Thorough drainage is the great distinguishing feature of the terraculture of the nineteenth century. It rewards the laborer with reduplicating harvests, and gilds his future with the bow of promise. It is the foundation of all good cultivation. It is an indispensable condition of perfect success in Pomology. We might as well expect to promote the comfort and health of a man by seating him at a luxurious table, with his feet plunged in ice water, as to look for the healthy development and longevity of a fruit tree, when planted in a wet and uncongenial soil. The foliage may perform its functions, elaborating and maturing the sap, under a genial sky and salubrious air, but the temperature of such a soil below, will counteract all the propitious influences above.

In cold, undrained grounds, the disease of trees commences at the root, which absorbs injurious substances, and the tree ceases properly to elaborate its nutritious matter. Wherever there is an excess of water, and consequently too low a temperature, and the soil is not properly drained and thoroughly worked, the vital energy of the tree is soon impaired, and its functions deranged. Death by drowning is quite as common in the vegetable as in the animal kingdom, with this difference —that it is not so sudden. Many of the diseases, such as the spotting of the leaf and fruit, the canker, fungi and decomposition of the bark, are attributable to imperfect drainage. Perfect drainage permits the air and light to penetrate and sweeten the soil, warms it, and prepares its latent fertilizing properties for the nourishment of the plant. Hence, for the want of this, many of our trees never attain a large size, and die prematurely.

But in connection with thorough drainage is closely associated the necessity of deep and thorough cultivation of the soil. All lands intended for orchards or gardens should be thoroughly trenched or subsoiled. A suitable regard must, however, be had to the nature of the soil, and to the class of fruit for which it is intended. Surely it would be unwise to apply the same cultivation to the peach and the cherry, as to the apple and the pear, or to treat any of these on new and fertile grounds, as in old and exhausted lands.

Illustrations of the advantage of thorough drainage and deep cultivation are of common occurrence. For instance, we find in Quincy market what are deemed wonderful specimens of the Beurre Diel and other varieties of the pear, large and always fair, which in some other collections are subject to crack and blight. They are ascertained to have been grown in the garden of Mr. Bacon, of Roxbury, which was formerly a tan-yard in low grounds, where it had for centuries received the wash from surrounding lands, till it had acquired a depth of four or five feet. Here was thorough, though accidental drainage by means of a deep ditch cut through and around the grounds, to carry off the water of a rivulet originally flowing through them. While trees of this fruit, and of the same age, growing in the neighborhood and in undrained soil, yielded less than one hundred specimens of cracked and inferior fruit, he has gathered eight hundred from a tree of most beautiful character and quality in a single year.

The importance of thorough drainage and perfect preparation of the soil, have not received the consideration they deserve, especially where its silicious character does not furnish a ready natural conductor to superfluous moisture.

II.—*Appropriate Soil and Location.*

The influence of soils must not be overlooked in the cultivation of fruit trees, which, like other crops, abstract from the soil the ingredients essential to their growth, and must be supplied with the appropriate nutriment.

As early as the time of La Quintinyie the fact was well established that a tree would not flourish where one of the same species had previously grown and decayed. The reason of that

fact science has now developed. The old tree had left the soil deficient in the elements of growth and fruitfulness.

In relation to locality, some fruits succeed best in one place, others flourish well in several districts, and are elsewhere nearly worthless. A few are adapted to general cultivation.

By the soil for a tree, we do not mean the identical spot, the artificial bed in which the tree stands; for, in time, the roots take a wide range in search of food. Some fruits are good in nearly all places, others only in their original locality. Some succeed best on light loamy soils, others will thrive tolerably well in clayey soils. In the latter, many pears, for instance—the Beurre Bosc, Passe Colmar, Beurre Diel and Napoleon, are astringent, while in the former they are entirely free from this quality. The Beurre Rance, in England and in some parts of France, is the best late pear. So it is, also, in some of the soils of Belgium, while with others, and with us, it is generally inferior.

One of the chief causes of failure is the non-adaptation of the tree to the locality. Some varieties are constitutionally delicate and feeble; and, of course, more subject than others to climatic influences. They may be of exquisite flavor, but are not well adapted to general cultivation. These should only be grown by amateurs in favorable positions. Others are robust, vigorous, hardy as the oak, resisting the extremes of cold and heat, of tempest and storm, retaining their luxuriant and persistent foliage to the end of the season. Such are the Baldwin and Rhode Island Greening apples, the Buffum and the Lawrence pears.

But the limits of this report do not allow us to specify the particular locality and kind of soil adapted to each species and variety of fruit. A treatise, which shall teach this upon scientific and practical principles, is a desideratum in fruit culture which we hope some one will, at no distant day, supply.

III.—*Climatic and Meteorological Agencies.*

Seasons vary in the degree of their temperature and humidity. Where they are cold and wet, the fruit is often insipid and watery. So powerful is the action of meteorological agents on the flavor and other qualities of some fruits, that we can hardly believe they grew on the same tree in different years.

As an instance of the influence of climate, the fact is significant, that out of fifty varieties of American peaches, which succeed admirably in our own country, and which were sent, some years since, to the Horticultural Society of London, only two were adapted to that region.

In further illustration, some varieties of fruits, which have been cast off, as inferior or worthless in Massachusetts, are found to be of excellent quality when cultivated in the genial climate of the south.

Vicissitudes attend the cultivation of fruit trees, as well as forest trees, and other vegetable products. How often a severe winter proves injurious to our fruits. Within the knowledge of many of us, our hardiest varieties of the apple as well as of the pear, have been injured by sudden revulsions of climate. But these should no more discourage the pomologist, than the occasional failure of the farmer's crop by frost, drought, or other causes, should prevent his planting the succeeding spring. It is our firm persuasion that the failures which have occurred in fruit-growing, are generally attributable, either to improper soil and varieties, to injudicious treatment, or to neglect of cultivation. Hence, these failures, wherever they exist, show the importance of the prominent object of this Board, which is to embody and promulgate the scientific principles and the personal experience that shall reduce the number of such failures, and in the end, prevent their occurrence.

IV.—*Manures and their Application.*

It is a well established fact, that certain substances exist in plants and trees, and that these must be contained to some extent in the soil to produce growth, elaboration and perfection. Trees exhaust the soil of particular ingredients, and, like animals, must have their appropriate food. All know, as we have before intimated, how difficult it is to make a tree flourish on the spot from which an old tree of the same species has been removed.

How shall we ascertain what fertilizing elements are appropriate to a particular species of fruit? To this, two replies are rendered. Some say, analyze the crop; others, the soil. Each, we think, maintains a truth; and both together, nearly the whole truth. We need the analysis of the crop to teach us its

elements, and that of the soil to ascertain whether it contains them; and if it does not, what fertilizers must be applied to supply them. By an analysis of the ash of the pear, the grape, and the strawberry, we learn that about 20 per cent. of their constituents consists of potash. This abounds in new soils, and peculiarly adapts them to the production of these fruits, but having been extracted from soils long under cultivation, it is supplied by wood ashes or potash, the value of which has of late greatly increased in the estimation of cultivators.

Among the arts of fertilization, universal experience attests to the great advantage of *mulching* around fruit trees, as a means of fertilization and of preservation from drought in heat so common with us in midsummer. In illustration of this, experiment has proved that on dry soils, where the earth has been strewn with straw only, the crops have been as large without manure as with it, where evaporation has disengaged the fertilizing elements of the soil. One of the best cultivators within our knowledge mulches his orchard with manure, covering the whole surface to the depth of two or three inches.

Mulching, as I have already said, is a great preventive from sudden changes of temperature, rendering the earth warmer and more agreeable in winter, and more cool and moist in summer.

A difference of opinion exists in regard to the question whether manures should be applied upon the surface, or at what depth beneath it. We hoped that the answers to the inquiries in the circular sent out by this Board, would help to settle this question, but from the small number of returns we fear that no satisfactory opinion can be formed.

The gardener of Louis XIV., in his admirable treatise on fruit culture, translated by Evelyn in 1680, says manures should be applied to trees in the autumn upon the surface, that the rains, snow and frost may convey the elements of fertility to the roots. He adds, "we are certain that by this method one load will do more good than two used in the common way of trenching in to the depth of one foot."

The theory of surface manuring has lately received attention and favor, both in this country, and in Europe. Mr. Charles B. Calvert, President of the Maryland Agricultural College, has for many years applied his manures on the surface after

planting his crops. Mr. W. H. Ladd, late President of the Ohio State Board of Agriculture, practices upon the same principle, both with favorable results. Our own experience corresponds with theirs.

An orchard should always be kept under cultivation, and no other crop should ever be grown upon the soil, except when the trees are small, and the roots occupy but a very limited portion of the land. Even then, no additional crop should be grown, unless it be a few vegetables midway between the rows.

And when the trees arrive at maturity, cultivation should not extend to a depth of more than three or four inches, never allowing the grass or other crops to grow, never disturbing the roots with the plough or spade. A celebrated orchardist of Massachusetts, who sends annually a large quantity of fruit to market, only scarifies the surface of the land, and upon it applies his manure in the fall. The practice of seeding down an orchard to grass or any other crop, and digging circles around the trees, is believed to be of little or no comparative benefit, and should be carefully avoided.

An illustration from Mr. J. J. Thomas, one of the most experienced fruit growers of New York, will explain the rationale of this and of the influence of surface manuring. "I have," says he, "long since discovered that spaded circles scarcely benefit the tree: and a few years since I performed an experiment to determine definitely the distance at which a tree would draw nourishment through its roots. A dozen trees of the same size and variety were set out on a piece of uniform land, and were cultivated for a few years, until about ten feet high. A portion of the trees were within three feet of a compost heap—the rest at various distances from it. Those standing nearest the compost made a summer's growth of four feet and eight inches. The tree that stood seven feet off, almost as far as the height of the tree, threw out shoots two feet and five inches in length. The next, at a distance of fifteen feet, made fourteen inches in length—while all others, twenty or more feet distant, grew but seven inches.

Thus we see how much a tree was benefited, by a heap of manure fifteen feet distant, and from which only a small portion of the roots on one side could derive any nourishment —proving conclusively that the roots extend on each side to

at least an equal distance; that is, that they formed a radiating circle of fibres, no less than thirty feet in diameter, or three times as great in breadth as the height of the tree. How perfectly futile the attempt to benefit such a broad surface by spading a circle two or three feet in diameter, which would be but one-hundredth part of the whole area of the branching fibres.

Thus we see how any other crop grown in an orchard must extract fertility from the trees.

In further confirmation of this theory, we add that last autumn, when other orchards bore but little fruit, we visited one in Norfolk County, of twenty years' growth, in which no other crop was permitted to grow. The trees were bending beneath their burden of fruit, some yielding from four to five barrels each of handsome fruit. On asking the cultivator, "Have you ever allowed any other crop to grow in this orchard?" he replied, "No indeed! I am not fool enough for that. Why should I starve my trees to feed a less valuable crop?"

V.—*The Importance of producing from Seed new and improved Varieties suited to each locality.*

It is generally conceded that the trees and plants of any country, like its native inhabitants, will flourish better at home than in foreign lands. Many cultivators are now engaged in this interesting department of pomology, and great encouragement is found in their success. Witness the many new varieties of American fruits which are fast supplanting foreign sorts? Of the kinds recommended by the American Pomological Society for general cultivation thirty out of thirty-six kinds of the apple, ten out of fourteen of the plum, one-half of the pears, and to mention no other class, all the varieties of strawberries are natives.

We name, as a single illustration of peculiar adaptation to our soil and climate, the Baldwin apple, Buffum pear, Downer's Late cherry, and Hovey's Seedling strawberry.

Here has already been fulfilled the prediction of the celebrated Dr. Van Mons, that "the time will come when our best fruits will be derived from our own seedlings."

Without entering minutely into the different processes of obtaining seedling fruits, whether from Van Mons' system

of amelioration, or by that of Knights'—from cross fertilization of varieties, we recommend the planting of the most mature and perfect seed of the most hardy and vigorous sorts, depending mainly upon natural fertilization, and upon the general pathological principle, that like produces like. This recommendation rests upon the conviction that immature seed, here, as in other crops, will not produce a vigorous and healthy offspring.

"All experience shows," says Dr. Lindley, "that in every kind of created thing, be it man, or beast, or bird, the mysterious principle called life remains, during the whole period of existence, what it was at first. If vitality is feeble in the beginning, so it remains. Weak parents produce weak children, and their children's children are weaker still, as imperial dynasties have shown." This theory is as applicable to the vegetable kingdom as to the animal.

May not a disregard of this doctrine account for the great number of feeble, sickly, early defoliated trees often found in our grounds by the side of those that are vigorous, healthful and persistent in foliage? Is not the theory we advocate as important in the production of fruit trees, as in the raising of cereal grains? The skilful agriculturist saves the best seed of his various crops, and selects the best animals from his flocks and herds for breeders. Why should not this law of reproduction regulate the practice of the pomologist as well as of the farmer? Has the All-wise and Infinite enacted several laws, where one would subserve the purpose?

But there is one objection urged to the raising of new varieties from seed, so general and powerful in its influence as to merit a distinct notice. A false doctrine has prevailed, founded on the theory of Van Mons, "that scions taken from seedlings, and grafted into stocks, however strong and healthy, will not yield fruit earlier than it may be obtained from the mother plant."

Adopting this theory as true, many cultivators have been discouraged on account of the length of the process. With due deference to the wisdom of this great cultivator, our personal experience and observation disprove his theory. For instance, the fact is familiar, that scions of the pear come into bearing, when grafted on the quince, earlier than on the pear

stock. This results from the early fruiting of the quince, which imparts its own precocity to the scion. We realize a corresponding hastening to maturity when a scion is grafted into a pear tree which has also arrived at a bearing state; especially is this to be expected when the stock is, in itself, one of a precocious character. If any facts seem to oppose this doctrine, they are either exceptions to the general law, or results of locality and cultivation. The bud contains the embryo tree, and the strong, precocious stock constrains it to elaborate more material into wood and foliage, and thus promotes both growth and fruitfulness. Witness the pear, which often fruits the fourth year from seed, when grafted on the quince. By this process a gentleman in this vicinity has produced fruit in the third and fourth year from seed. We know a seedling from the Seckel pear, grafted on the Bartlett, which bore in four years from the seed. Other seedlings have been brought into bearing by grafting on the quince in five years, while the original plants, in all these instances, were only three to five feet in height, and would require several additional years to bring them into bearing. It is not reasonable to suppose that a seedling pear, which, in two years, in a given location, attains the height of one or two feet with but few branches, will fruit as early as a scion from the same seedling, when grafted on a strong tree, which elaborates and assimilates through its abundant branches and luxuriant foliage, ten times the amount of all the elements constituting growth and maturity. We therefore recommend the grafting and budding of seedling fruits at the earliest possible moment.

VI.—*The Pear upon the Quince Stock.*

In conformity with suggestions of the Board, we introduce, in this connection, some thoughts respecting the cultivation of the pear upon the quince stock, as strong objections have been waged against this practice by gentlemen of high respectability; and especially as we have often expressed our judgment in its favor, and in opposition to their opinion.

The failure of the pear upon the quince, in every instance, we imagine, is to be ascribed, either to improper selection of varieties, to uncongenial soil, or to inappropriate treatment. Only a limited number of varieties have as yet been proved

upon the quince. Some succeed better than upon the pear stock. The quince stock is a gross feeder. Dwarf pears should not, therefore, be planted where gravel, sand or clay preponderate. They should have a deep, luxuriant soil, and be abundantly supplied with nutriment. They should always be set deep enough to cover the place where they were budded, so that the point of junction may be three or four inches below the surface of the soil, and the pear will then frequently form roots independently of the quince, and will combine in the tree, both early fruiting from the quince, strength and longevity from the pear. For several of the first years they should be annually pruned, and kept in a true, pyramidal form. We have frequently seen trees of the same variety, on both quince and pear, side by side, enjoying the same treatment, while those growing upon the quince stock have attained a larger size and borne for several years abundant crops, before those upon the pear had scarcely yielded their first fruits. For example, an Urbaniste pear tree upon the quince, planted fourteen years ago has borne within that period fruit valued by a low estimate at fifty dollars, while one of the same variety on the pear stock, of the same age, and receiving the same treatment, has not yielded a peck of pears. Why, then, would not an acre of dwarf pear trees, with the same treatment, produce a corresponding result?

Dwarf pear trees are specially adapted to gardens and the suburbs of large towns and cities. "The pear upon the quince," says a distinguished cultivator, "is a great boon to those who live in villages, where thousands are now enjoying the fruit of these trees, who otherwise could have none." Hence we see the advantage of dwarf pear trees to people in advanced life, who, were they relying on the standard pear for fruit, would die without the sight thereof. Some of our best cultivators prefer them for orchards. Already these are extensively planted in many parts of our country with a special view to the market, and their production is most wonderful. In the last autumn we saw, in the grounds of Messrs. Ellwanger and Barry, of Rochester, N. Y., half an acre of the White Doyenné on the quince. From these they had then gathered forty barrels of fine pears, and for them they were receiving in the Philadelphia market, sixteen dollars per barrel, or six hundred

and forty dollars for the crop of the half acre, or twelve hundred and eighty dollars per acre. Another instance is that of Mr. T. G. Yeomans, of Walworth, N. Y., who, from one-third of an acre, containing one hundred and forty dwarf trees, gathered thirty barrels of the Duchesse d'Angouleme pears, which sold for five hundred dollars, or at the rate of fifteen hundred dollars per acre. Those varieties suited to this stock are now preferred on the quince by the most skilful and experienced cultivators, and they are being planted on the most extensive scale. A gentleman in the South, of great knowledge, has planted an orchard of five thousand; another, in the West, one of twenty-five hundred; and others in various parts of our country on a more limited scale.

In the vicinity of Boston there are many instances of similar success. One gentleman has an acre of dwarf pear trees, from which he has received about forty-five hundred dollars in nine years, while from thirty pear trees of the same age, on their own root, he has not gathered one hundred dollars worth of fruit. Among those who formerly denounced the pear upon the quince as a failure, there are some now who are its eloquent advocates.

In a word, our largest profits in pear cultivation have been from dwarf trees. The best fruits of our exhibitions are from the same source, and with appropriate soil, the right selection of kinds, judicious pruning, high cultivation, and a reasonable share of experience and enterprise, success is as certain as with any other crop.

VII.—*The Preservation and Ripening of Fruit.*

Much progress has been made in this art within a few years, and important results have been attained. The principle has been settled, that the ripening process can be controlled. Autumnal fruits have been kept and exhibited the succeeding spring. We have seen the Seckel, Bartlett, and Louise bonne de Jersey pears, in perfection in January, and even later. The maturity of fruit depends on fermentation. The saccharine is followed by the vinous and acetous. To prevent these, and preserve fruit in all its beauty, freshness and flavor, the temperature must be uniform and kept below the degree at which fermentation or the ripening process commences.

Our remarks, like our experience, have special regard to the pear, though the principle is doubtless susceptible of a more extensive application. Summer fruits should be gathered some days before the ripening process commences. A summer pear ripened on the tree is generally inferior. In respect to the latter, an American writer has so aptly expressed our own sentiments, that we use his language: "The process of ripening on the tree, which is the natural one, seems to act upon the fruit for the benefit of the seed, as it tends to the formation of woody fibre and farina. When the fruit is removed from the tree, at the very commencement of ripening, and placed in a still atmosphere, the natural process seems to be counteracted, and instead of fibre and farina, sugar and juice are elaborated. Thus, pears which become mealy and rot at the core, when left on the tree to ripen, are juicy, melting, and delicious, when ripened in the house." Various structures for the preservation of fruit have been built both in this country and in Europe; and experience shows that their object can be attained only by a perfect control of the temperature, moisture and light. Hence, they must be cool, with non-conducting walls, or a room within a room. This principle our farmers apply to the preservation of their winter apples, keeping those intended for use in the spring, in very cool, dry cellars, from which the light and air are excluded. Thus the external atmosphere, which either produces fermentation or conveys the agents which produce it, can be admitted or excluded at pleasure. It is possible, however, to keep the temperature of delicate fruits at so low a degree, and for so long a time, as to destroy the vitality,—especially with some varieties of the pear,—and therefore all power, ever to resume the ripening process. Experience proves that for the common varieties of the apple and pear, about forty degrees of Fahrenheit are best suited to hold this process in equilibrium.

The proper *maturing* of fruits thus preserved, demands skill and science. Different varieties require different degrees of moisture and heat, according to the firmness of the skin, the texture of the flesh, and the natural activity of the juices. Thus, some varieties of the pear will ripen at a lower temperature and in a comparatively drier atmosphere, than others,

while such as the Easter Beurré, and Vicar of Winkfield are improved by a warm and humid air.

Some varieties of the pear, ripening with difficulty, and formerly esteemed only second rate, are now pronounced of excellent quality, because the art of maturing them is better understood.

But so many experiments have been tried, or are in progress, and so much has been written on this branch of our subject, that we need not enlarge except to say that the art of preserving and ripening fruit in perfection, requires great attention and care; and until the characteristics of the various sorts are well understood, must be attended with considerable difficulty.

VIII.—*Diseases and Insects injurious to Vegetation.*

The diseases of fruit trees may be resolved into two classes: the natural or spontaneous, and the accidental or contagious. These should be carefully distinguished, and their symptoms considered, to ascertain their primary cause, and to determine whether they are local or general, whether they effect the whole tree or a part of it, as the root, the branches, or the fruit. Researches in this department should be encouraged by the general belief that there are few, if any, diseases of vegetation, for which there are no remedies. This subject having been referred to an able committee of this Board, of which Dr. J. C. Bartlett is chairman, we will not enlarge upon it.

The increasing destruction of our crops by insects has directed to this subject the attention of scientific gentlemen, such as Professor Jenks, of this State, Professor Fitch, of New York, and others in different parts of our country, whose labors have called forth the action of our legislatures to arrest the progress of this evil.

We rejoice in the prohibitory laws of this State against the destruction of birds which feed on these insects. Already we have illustrations from the Old World, showing the wisdom of this law. Our worthy correspondent, Mr. Bivat, Secretary of the Belgian Pomological Society, writes us: "The destruction of the small birds, on account of the high prices which they bring in the market, has made them very scarce, and as a natural consequence, the insects upon which they feed have greatly increaesd and destroy much of our fruit crop. Of sixty-five

Bartlett pears, gathered from a single tree, only two were fit to eat, all the rest being perforated through and through by worms. So great is the scarcity of fruit," he continues, "we are obliged to send to France for specimens for our exhibitions, and common apples have been here sold at the exorbitant price of ninety-five francs per sack, or about six dollars per bushel."

In respect to the description and habits of insects, injurious to vegetation, we refer to the new illustrated edition of Professor Harris on Entomology, now in course of publication by the Commonwealth, and from whose researches the public have already derived inestimable advantages.

IX.—*Profits of Fruit Culture.*

The question has often been agitated, Can fruits be grown in Massachusetts at a profit? Your committee answer in the affirmative, premising that the conditions of success are high and judicious cultivation. Our proximity to the markets of large towns and cities, continually multiplying, will, in future years, greatly increase the demand for fruits, especially for those which cannot be brought from more remote places.

The profits of this crop entitle it to the consideration of legislators, as well as to our fellow-citizens. Any farmer will be convinced of this who compares the value of his fruit with other crops, and who considers how easily he might greatly enhance that value. In confirmation of this opinion we subjoin a few instances within our personal observation, of undoubted authority.

A farmer in Dorchester, Norfolk County, from thirteen acres of land devoted to apples, pears, peaches and currants, receives annually from $2,500 to $3,500 for his crop.

A fruit grower in Roxbury has about one acre devoted to the pear. The oldest trees were planted eighteen years since, but more than half of them within a few years. From two trees, the Dix and Beurré Diel, he has realized more than one hundred dollars a year, and for the whole crop, over one thousand dollars a year.

Another fruit grower in the vicinity of Boston raises from one acre and one-half of pear trees, $600 to $900 annually of marketable fruit.

A cultivator at Belmont, Middlesex County, the last season, from two-fifths of an acre, raised and sold 2,115 boxes of strawberries, or at the rate of about 165 bushels per acre. The estimated value of these was $1,300 per acre. Most of them were Hovey's Seedling.

The blackberry, the currant and other small fruits are cultivated largely for the market, and at great profit; the former has yielded two hundred bushels to the acre.

Many other instances of success have come under our immediate observation, but these must suffice.

X.—*Pruning.*

When we consider the profound philosophy involved in the various systems of this art, we freely confess our inability justly to represent our own impressions, or faithfully to report those of others. We shall only mention a few general principles. It is a doctrine of physiology, applicable alike to animals and plants, that the power of production depends upon vital energy; and this again, on sustenance. Hence a tree can support only a given amount of perfect fruit. If from a superabundance of fruit-spurs, or immature wood, there be a deficiency of organizable matter to sustain inflorescence and perfect fructification, the specimens will be either imperfectly formed or will prematurely drop from the tree. Of this we have many forcible illustrations where varieties bloom abundantly without setting their fruit; or which bear full crops only in alternate years. The remedy for such an evil, provided the soil is properly manured and other circumstances are propitious, is judicious pruning. In such instances it is important to remove a part of the fruit-spurs; or, if there be a redundancy of fruit, to thin it out by picking off the inferior specimens.

Different species, and different varieties of the same species, require different systems of pruning, in order to control their propensities and develop their appropriate form. Hence a thorough knowledge of the characteristics of each sort, and of the general science of Pomology is requisite for judicious and skilful pruning.

The precept, "Train up a child in the way he should go, and when he is old he will not depart from it," contains a principle as applicable to vegetable physiology as to domestic economy.

In both cases the true philosophy of life is to begin early and proceed with caution. The pruning-knife of the pomologist, like the amputating instrument of the surgeon, should be used only to answer the demands of stern necessity. Hence large limbs should not generally be removed from old trees, on the same principle that severe surgical operations are commonly more dangerous to aged people than to those in the morning of life.

Remove from a young tree a limb, and the activity of its sap soon heals the wound, and restores the equilibrium. But it is not so with an old tree. To injudicious pruning, or to the utter neglect of it, we think may be ascribed, in a great measure, the unproductiveness and premature decay of so many of our old orchards in New England.

We have space only for a few illustrations of the importance of skill in this art. Some varieties require but little pruning, naturally assuming a handsome form, as the Buffum, the Lawrence, the Bartlett, and the Meriam pears. Some, as we have already intimated, bear only on alternate years, the superabundance of their crop preventing the formation of fruit spurs for the succeeding year. These may be made to bear annually by cutting out one-half of the spurs on the bearing year; or, if we deprive every other tree in an orchard of all its fruit blossoms on that year, one-half the trees therein will bear one year, and the remainder the next. This remark is peculiarly applicable to the Baldwin apple, which, in most localities, for the reason above named, bear only on alternate years.

By a similar process, the quality of fruit may be often much improved. Witness the Passé Colmar pear, so redundant in its fruit-spurs as to require the removal of a part of them to obtain fruit of excellence.

As to the season most appropriate for pruning some say it should be done in the time of florescence; others, when the foliage is falling; still others, in the winter, when the sap is inactive. But our judgment is in favor of early spring just before the sap begins to rise; or of midsummer immediately after the first growth. In the latter case, the sap has become thick by elaboration, the tree will not bleed, and the wound will heal more readily than at any other season of the year. But at whatever time pruning is done, all limbs larger than a man's thumb should be covered with wax, clay, or other substance, to protect them from the weather.

CULTURE OF THE GRAPE.

The grape has been cultivated from the earliest ages, and has always been considered the type of plenty and felicity. To sit under one's own vine and fig tree in security was thought to be the height of human happiness. In all ages grape-growing has been at the head of all fruit culture; and those lands whose soil and climate permitted their cultivation, were reckoned peculiarly favored by nature, and coveted by mankind.

In Europe the Eastern grape, originally brought from Syria, and gradually acclimated, has been grown for ages, and wine made from it has attained a vast commercial importance.

It was early introduced into this country, and intelligent horticulturists have cultivated it in all our various climates, but, except under glass, without success, even in our southern States, where the climate is considered peculiarly favorable to the grape.

Whether this is owing to the vicissitudes of our variable climate, greater than those of France and of the west coast of Europe, or to soil and cultivation, is not of much consequence; the fact is patent, and we must turn to other varieties if we hope for success in raising grapes and making wine.

Fortunately, we have grapes native to the soil, and adapted to our climate. Of these, I shall only speak of the *Vitis Labrusca*, which is found from Maine to New Jersey, growing wild and rampant in our pastures and by our water courses.

This grape is characterized by its thick foliage, strongly ciliated on its under surface and around the stomata or breathing pores, its long jointed wood—good sign of vigor—often rough and bristly, and its perfect hardiness. It is not, however, good enough for the table, in its natural state, having a tough pulp and a disagreeable aroma, commonly designated as foxy. But its complete adaptation to our variable climate, its hardy character, and comparative indifference to soil and location, point it out as the parent of the grapes—yet to come—which shall be good enough to satisfy the fastidious fruit grower, and by its abundant crops give a liberal income to the intelligent cultivator. We have arrived now at that stand point from which we can see the error of our fathers in relying upon the European grape. In all sections of the country cultivators of skill and

experience have tried the foreign grape in all its varieties, again and again, without success; they have turned at last to our native grape, and in some instances, met with eminent success. The famous Catawba grape and the wine made from it have a fame as wide as the Union; and the Isabella, though shorn of its fame by reason of our bad seasons, is still reckoned by many our best table grape.

The problem before us is, whether grape culture can be made profitable in Massachusetts. Can we succeed in growing grapes which shall be good for the table and profitable for market? For we shall not be likely to go into grape growing without a fair prospect of remuneration. Few of us can afford to grow grapes, which require protection in the winter and costly modes of culture in the summer, and which, perhaps, after all, give but a meagre return for all our trouble and expense.

I think we may answer this question in the affirmative. Notwithstanding all the failures incident to mildew and rot, to tenderness of constitution of many of the new grapes, to want of experience, defect of soil or local difficulties, grape culture is rapidly extending in Massachusetts, and if we can only find grapes which will bear a certain degree of neglect, be prolific, hardy—this is indispensable—and if we are not so unreasonable as to require the excellence of the Black Hamburgh in addition to these qualities, I believe grape growing is sure to become one of the most profitable branches of the husbandry of our good old State.

I have said the *Vitis Labrusca* is comparatively indifferent to soil and location, but I do not mean to say that the quality of the fruit will not be affected by them. All experience shows that fruits of all kinds are affected by soil and climate, and the grape especially. The finest sherry wines are produced from a soil which contains, according to Roxas Clementi, a Spanish writer upon the wines of Andalusia, about seventy per cent. of carbonate of lime, the remainder being clay with a little sand. The sandy lands of the same department yield an inferior wine.

The experience of grape growers in this country shows those soils containing lime to be best adapted to the grape, but, although the quality of grapes is certainly affected by different soils, good grapes may be grown on any soil which is *light* and

rich, *warm* and *friable*, so that the tender roots can penetrate it easily.

All writers on the grape, concur in giving the first place to a south aspect. A gentle slope, sheltered from the north and east winds, and on which the sun darts his genial rays during the whole day, warming the earth to a good depth, and bathing the plants in light from morn till night, is undoubtedly the best. In such a situation the plants receive a larger share of light and heat than in any other; and light and heat are the great essentials in the successful culture of the grape. The vine will succeed well, however, in any aspect from east to west, but always the best where the sun warms the earth to the greatest depth; a south-west aspect will be better than a south-east, and a west better than an east, because the sun lays upon it in the latter part of the day, and in the autumn, when the grapes are ripening, this afternoon sun is of great service. We do not, however, always have choice of aspect; but we may cultivate the grape successfully in any aspect, from west to east, preferring first the south, next south-west, next south-east, next west, lastly east.

The season in Massachusetts is too short for the Catawba, Isabella, and many other varieties of grapes, to mature their fruits, except in the most favorable situations, as against a house, or upon the south side of close fences. It is also full of vicissitudes, the thermometer frequently indicating fifty degrees of variation in twenty-four hours. Cold and wet are alternated with heat and drought. It requires a robust and vigorous habit on the part of the vine to resist such changes, and it is doubtful if it is worth while to waste time and money upon the tender varieties of the vine in such a climate.

Amateurs may indulge in such expense; let us honor them for it. They try all new plants, though the majority of them will prove worthless, as they well know, but they draw some prizes, and are liberal in taking the venture. Such men founded the Massachusetts Horticultural Society, which has done excellent service in promoting the science of horticulture in the State; and to such men we are indebted for the improvement in our cattle and our modes of husbandry, which add so largely to the wealth of our people. Perhaps more valuable seedling fruits have been produced in Massachusetts than in any other

State, and this fact is largely due to the quickening influence of the society just named, and to the liberal premiums they have bestowed.

The raising of new varieties of grapes from the seeds of the best natives, is probably the most direct way to obtain such kinds as will be best adapted to our climate, good enough to satisfy our taste, prolific and profitable for the market. This will be a work of time, but it is fairly begun and must succeed.

Perhaps I cannot do a better service in this connection than to state my own experience in this branch of horticulture. Having pursued it for nearly twenty years, and finding my first opinions greatly modified in the course of that time, I may perhaps save the beginner some time in his practice which he might otherwise lose for want of reliable data to commence upon.

I was led to commence the raising of grapes from seed, from the impossibility of ripening any of the grapes then in the lists of the nurserymen. Living in the valley of the Concord, with a season shortened at each end by the early and late frosts incident to such localities, loving grapes more than all other fruits, but not able to ripen them, I turned to our native stock and procured from all quarters native vines which had a local reputation for excellence, but found myself disappointed in all of them.

Believing that a good grape could be obtained out of this stock, and that if I attained success it would lead others to follow the same course, so that in time Massachusetts could have her own grapes, as she already had her Baldwins, her Porters, her Hubbardston and other excellent seedling apples; I set about the matter; I wanted a grape to begin with, which should be a vigorous grower, prolific, early, hardy, and with these preliminaries of as good quality as possible. I found a grape having these qualities—a pretty good eating grape for a native—and with this I began. In five or six years the seedling bore fruit; these seeds were planted again, and in the third generation I found the habit so broken up that I got grapes of great variety in color, shape and quality, some of them excellent, if I may trust my own judgment. From the original stock, black as night, I have obtained grapes white as the Chasselas, delicate of texture, and of a most agreeable flavor.

I had planted these seeds promiscuously in beds of rich soil, and when these seedlings bore fruit, *their* seeds were planted in the same manner. This was not the best way. I raised many hundred more seedlings than I had need to, and should have succeeded more rapidly if I had planted only the seeds from the grapes, showing the most marked change from the original type. I thought I multiplied my chances of success by putting all the seeds into the ground; I had not yet learned that nature makes constant efforts to return to her normal condition, and resents the interference of man. Her purpose is merely the continuation of the species, and she gives vigor and adaptation to that end. The horticulturist desires the fruit, and not the seed. His efforts are directed to ameliorating the harshness of flavor, to softening the pulp, to making, in short, the fruit more edible. He accomplishes this by putting the seeds into a soil rich with stimulating composts, abounding with the particular food which is best adapted to his purpose.

The new conditions change the character of the plant. Instead of meadow or pasture, where the parent vine grew with vigor, indeed, but with the coarse habit incident to wild nature, the new-born seedling revels in the abundant and congenial food prepared for it, and grows apace with cells and tissues enlarged, and stimulated by the nature of its feeding, and shows a change of habit more or less marked. In a bed of a thousand seedlings there will be vines showing a decided difference from the rest in shape and texture of leaf, length of joint, and shape and prominence of buds. These are the signs of improvement, of the *departure* from the native type, and the tokens of success to the cultivator. These vines deserve his special care, from them he will obtain vines with still more marked change of habit, and the greater the divergence from the original type, the more certain will be his success.

In the third and fourth generations great differences of shape and size will be observable, and it is probable that size, color, or any particular quality could be established as a characteristic in the progeny of such grapes, by continued breeding from them. I do not advance this idea as a fact established, but a probability worthy the attention of the breeder.

Full details of all the facts and circumstances relating to grape breeding cannot be given in a brief essay like this, but it

may be necessary to state that most of the seedlings, if you begin with the wild grape, will prove to be barren or worthless in the first generation. The barren grapes may be distinguished, for the most part, by their great luxuriance of growth, and, in *the first year*, the seed bed will be filled with these rampant, and, to the novice, promising vines. My experience leads me to reject these strong growers of the first year, or to plant them by themselves, as possibly I might get a good grape out of them, and, if so, the strong habit of growth is desirable.

I have spoken of these seedlings of the first year, because the seeds continue to come up for two, three, and even four years, and my best grapes come from these later crops.

I think there is much probability in the theory propounded long ago, that one or more seeds of every fruit is strongly impressed with the peculiar type of the species to which it belongs, and will bring its like with precision, as happens with long established breeds of cattle. How far seeds of grapes are impressed with incipient change by stimulant composts, or modes of culture applied to the parent vine, is an interesting inquiry for the horticulturist. I may be able, when farther experiment has furnished me with more numerous and reliable data, to furnish to the public some facts in elucidation of this obscure subject.

I would strongly advise those who purpose to raise seedling grapes, not to go back to the wild vine, but to take seeds of new varieties, having the characteristics of vigor, &c., which they desire in the offspring. Plant the grapes whole, in rows to facilitate weeding. The placenta-like substance about the seed in the whole grape, nourishes the seed, and promotes its vegetative power. When the seedlings have grown one year, lift them out of the bed without disturbing the level of the ground. This can be easily done if the bed is thoroughly saturated with water, and with the aid of a fork to loosen the ground, while you draw the plant out carefully without breaking a single root.

The second year another crop will come up; these will give a greater proportion of bearing vines. These are lifted in the same way as at first, to make room for the third crop which will succeed them. These last I save with the utmost care, as they will show the greatest improvement.

When these seedlings are planted out, they should be put into good soil enriched with bone-dust, ashes, and sulphur or plaster. These fertilizers I consider indispensable to the grape. Stable manures induce luxuriant growth of wood, but if applied to vines not carrying crop, give a lax tissue to the vine; if it is in crop you may safely apply them as top-dressing, to increase the size of the fruit, but many good cultivators believe it impairs the flavor of the fruit. It is a moot question.

I do not prune the seedling vine, except to give it shape, but pinch in any branch which may be growing too rampant. These seedlings will not bear until the fifth or sixth year.

Do not reject too hastily the vine at its first fruiting, for the quality and size of the fruit will steadily improve for many years. The grape vine does not reach its best estate until seven or eight years after planting.

There are various modes of pruning the grape, all of which have value and adaptation to particular circumstances, as covering a certain space, an ornamental espalier, or the production of large bunches of fruit. And this last is an object of some importance, for, other things being equal, the largest and handsomest bunches are the most valuable, often bringing in the market double the price which can be obtained for small bunches.

I shall speak of the renewal, or long cane system, and spur pruning; either of which, judiciously followed, will give good crops and large bunches, always supposing the kind of grape cultivated will give large bunches, for many kinds of grapes, though of fine quality, cannot be made to give large bunches under any kind of pruning. I should mention, also, that some kinds of grape, as the Clinton, Strawberry, and such grapes generally as make long, slender wood, must be laid in long canes upon the espalier to give good crops.

To begin at the beginning, then, we will suppose the vine just planted and cut down to two eyes; after these two eyes have grown about a foot, pinch the weakest one at the end and train the strongest one to the pole or espalier. If it run away weakly, pinch it occasionally, which will set back the sap and thicken the stem; it will probably push out lateral shoots, which should always be pinched at the second leaf; this will prevent the formation of weak, watery shoots, and strengthen the leader.

At the end of the season cut back the long shoot to the lower bar of the espalier, which is usually about eighteen inches from the ground, and cut the short one clean back to the old wood, your purpose being to have a single stem for about a half yard from the ground; but if the grape is trained against a house, and it is desired to lead off the side arms at a greater height, as above a door, &c., then cut off the vine at that height, observing that there must be but one stem from the ground to the point from whence the arms diverge; and any shoots which come out at the base of the vine, must always be rubbed out, lest they run away with the strength of the vine and rob the upper shoots of the necessary sap.

The second year you will allow two shoots to grow from the top of the vine; lay them in diagonally on the espalier, pinching them occasionally as before, and if the buds on the main stem push, pinch them at the second leaf as before. I forgot to say that at the fall pruning, all the laterals should be cut clean out. If dry weather ensue, water occasionally at the root, and syringe the foliage occasionally if you have leisure. At the end of the season cut away all the laterals and lay in the two shoots right and left on the espalier, horizontally, cutting each of them back to a strong bud. Be sure to cut back to a strong bud, for these arms are to be permanent, and it is necessary the wood should be strong and well ripened.

The third year you may take a few bunches, if your vine is strong, but it is better to wait until the fourth year, as the bearing even a few bunches checks the extension of wood. Your side arms will push every eye. Train upright shoots from these horizontal arms at about eighteen inches distance; this will usually be every alternate bud; rub out the bud in the interval, all buds, if there be more than one between these upright shoots; pinch all laterals at the second leaf as before, whether on old wood or new, and pinch the upright shoots when they get to the top of the espalier; sooner, if they run away weakly.

In the autumn, cut every alternate upright shoot back to one eye, to make new shoots next year for subsequent bearing, and leave the others at full length for bearing, unless they are not strong; in that case cut them back to a strong bud. It may happen that the side shoots will take several years to fill up the

espalier with strong wood; but do not fail to cut them back at every fall pruning to a strong bud, making sure of getting strong wood, though you get it little by little; cut away all laterals as before.

You have now got a number of upright shoots for bearing; every eye will push and probably set fruit, and now, unless you have the firmness to cut out two-thirds of the fruit, you are in danger of over cropping the vine with its first crop. Not more than twenty bunches of fruit should be allowed to remain, and these should be of the largest and best placed. The thinning should be done when the young grapes are as large as young peas; pinch these laterals, now bearing fruit, at four leaves beyond the bunch you leave on; this will generally be the first or second bunch, the largest of course. If the laterals push again, pinch at the second leaf as before. You will train up the alternate shoots, pinching them at the top of the espalier, and also all laterals as before. These are to be the bearing wood of next year. After the fall of the leaf, prune out all the upright shoots which have borne fruit to one bud, and all laterals from the new shoots which you have trained up for bearing next year.

This is the system known as the renewal system. It is well adapted to the house or the espalier. If applied to vineyard culture, you must have two poles to each vine, (after the third year,) cutting out each cane in alternate years.

Spur pruning, however, is best adapted to field culture in our climate, if I may trust my own experience. The vine is not called upon to make so much wood, and after it is well established, any intelligent boy who can handle a knife, can prune the vine as well as a thorough-bred gardener. Train up your vine as before, with a single stem; cut out all laterals at the end of the first year; and cut back the main stem to eighteen inches from the ground; lead up a single stem from the upper bud the next year, tying it to the pole and pinching when it has reached to the top of the pole, which should be six feet high. Pinch all laterals, as in the renewal system, and if the main stem is not strong, cut back to a strong bud.

The next year you will make your spurs; let them be alternate, right and left, and as nearly equi-distant as possible. Pinch them in occasionally, and if side shoots push, pinch them

at the first leaf. Do not let the spurs grow more than half a yard or two feet long, for you want strong buds at the base of the shoot to bear next year.

At the fall pruning, cut back the lowest spur to three eyes; cut out the second and third spur to one eye each; this brings you to the fourth spur, which is opposite the first; cut this back to three eyes; proceed as before through the whole length of the vine. You will have alternate spurs for fruiting, and the intervening spurs cut back to one eye, to make bearing wood for the next season, when the spurs which have borne this year are to be cut back to one eye, to make new spurs for alternate bearings. A modification of spur pruning, practised by some grape-growers, is to cut back the spur to the strongest bud, without regard to the length of the spur; rubbing out the shoots from the other eyes, except the one at the base of the spur, which is trained for the new wood of the next season, the old spur being cut clean out, at the fall pruning. Well established vines, spur pruned, generally ripen their crops a few days earlier than vines pruned on the renewal system.

The best time of pruning for this latitude is probably the early part of November. If the vine is pruned at that time, the organizable matter which the roots continue to take up until hard frost prevails, charges the wood and the buds, making them to start with more vigor in the succeeding spring, and perhaps increasing, to some extent, the size of the bunch. It is safe, however, to prune at any time after the fall of the leaf until the succeeding spring, avoiding to prune when the wood is frozen, or so late in the spring that the vine will bleed, which would be likely to happen at the beginning of April.

The grape may be propagated by eyes, or by cuttings of several eyes, or by layers. The bud or eye gives the finest vines, but not having much organizable matter laid up in the wood—as is the case with cuttings—to support it in the early stage of its growth, it will require a year longer to get a strong vine from it than it would from a cutting. Layering is adopted when the vine makes root slowly. Some vines cannot be grown from cuttings without great difficulty; such vines are usually propagated by layers.

In summer pruning I never take off the leaves of the vine; it has no more leaves than are necessary to elaborate the juices

of the vine into true sap. The practice of taking off the leaves to let the sun upon the fruit came to us from England, where their less vivid sunshine seemed to make it necessary, but most cultivators even there have given it up as injurious.

Vines of native origin seem to require more room than is usually allowed in the vineyard. I plant eight feet by eight, and this does not seem too much. It is the custom in Europe to plant very close; and I have been advised by an intelligent cultivator, who was born in a vineyard in Germany, and who had also grown the grape in this country for some years, to plant the Concord grape in close order, with an assurance that, if I try it, I never shall go back to wide planting again.' I shall plant half an acre after his directions, and in due time report the result.

Vines may be trained to poles or the trellis; I prefer the latter, as more convenient for pruning and gathering the crop.

Much has been said of late about girdling the vine to promote early maturity, and to increase the size of the fruit. I tried girdling many years ago, and have abandoned it from a conviction that it impaired the quality of the grape, perhaps from overcharge of unripened sap, possibly from debility induced by disturbing the functions of the vine. As some cultivators may desire to try it, I submit the mode of operation.

With a sharp knife make a cut round the bearing branch, and below the fruit, quite through the bark to the wood. Make another cut one-quarter or three-eighths of an inch below the first cut; make a longitudinal cut through this ring of bark, when it can be easily detached from the wood. Do this when the grapes are of the size of peas. By this process the sap is impeded in its return through the bark, while its ascent through the wood is not interrupted. It forces the growth of fruit and leaf by engorgement of the sap.

Once in about a score of years this practice comes up anew. It is now recommended as a new mode of enlarging the fruit, and making it ripen before its usual season, but it is by no means new, and only seems to be so because intelligent cultivators, who gave it a fair trial in its last phase, discarded it so long ago.

In reply to the interrogatories of the circular on fruits, I would say that I grow most of the new grapes, but confine

myself to the *Concord* as the most reliable and hardy grape for field culture.

The Hartford is a very good grape, but has the defect of falling off when ripe.

The Rebecca is tender, and liable to mildew; it has been killed to the ground in my garden for two years past. If it was only hardy it would be a very desirable grape, as it is of fine quality, though small.

The Delaware is small in bunch and berry, hardy, and of fine quality. It is a slow grower, and ripens late in this latitude. It will probably ripen its fruit earlier when it is well established; it is yet new to this vicinity.

The Diana is now well known and largely cultivated in Massachusetts. It is a small grape of fine flavor, liable to mildew, and needs protection in the winter in gardens much exposed.

The Union Village has a large berry, of good flavor, but is killed to the ground in my garden every winter.

The Northern Muscadine is perfectly hardy, of tolerable quality, falls off when ripe.

The Isabella has suffered much during the late severe winters, and is dying out in many places; it should be protected in winter, and should, if possible, be grown on the south side of a building or fence.

The Catawba is too late for this latitude. I have ripened it but once in twenty-two years. It is of fine quality when well ripened, and perfectly hardy.

Your committee have been obliged, for want of space, to treat the foregoing topics in a very summary manner. Each of them needs enlargement and elaboration from the results of practical experience. Others have been entirely omitted.

Therefore, to the foregoing returns we would subjoin the last fruit catalogue of the American Pomological Society, which has become an authority in this republic and in foreign lands; and although the varieties here recommended are not, in some few instances, adapted to all localities, it will be found valuable for the purposes of general reference.

FOR GENERAL CULTIVATION.

Apples.

Am. Summer Pearmain.—*Sept.*
Autumn Bough.—*Oct.*
Baldwin.—*Dec. to June.*
Benoni.—*Aug.*
Bullock's Pippin.—*Oct. to Jan.*
Carolina June.—*Aug.*
Danvers Win. Sweet.—*Dec. to Mar.*
Early Harvest.—*Aug.*
Early Strawberry.—*July to Aug.*
Fall Pippin.—*Oct. to Dec.*
Fameuse.—*Nov. to Dec.*
Gravenstein.—*Sept. to Nov.*
Hawley.—*Sept. to Oct.*
High Top Sweeting.—*Aug.*
Hubbardston Nonesuch.—*Oct.–Jan.*
Jonathan.—*Nov. to May.*
Lady Apple.—*Nov. to May.*
Ladies' Sweet.—*Oct. to May.*
Large Yellow Bough.—*Aug.*
Melon.—*Oct. to Jan.*
Minister.—*Oct. to Jan.*
Monmouth Pippin.—*Nov. to Feb.*
Porter.—*Sept. to Oct.*
Primate.—*Aug.*
Rambo.—*Oct. to Dec.*
Red Astrachan.—*Aug.*
R. Island Greening.—*Nov. to Feb.*
Roxbury Russett.—*Dec. to June.*
Smith's Cider.—*Dec. to Mar.*
Summer Rose.—*Aug. to Sept.*
Swaar.—*Nov. to Mar.*
Vandervere.—*Dec. to Mar.*
Wagener.—*Dec. to May.*
Williams' Favorite, (except for light soils.)—*Aug.*
Wine Apple, or Hays.—*Jan. to Mar.*
Winesap.—*Oct. to Feb.*

Pears.

Ananas d'Eté.—*Aug.*
Andrews.—*Sept.*
Bartlett.—*Sept.*
Belle Lucrative.—*Oct.*
Beurré d'Anjou.—*Nov. to Dec.*
Beurré d'Aremberg.—*Dec. to Feb.*
Beurré Diel.—*Nov.*
Beurré Bosc.—*Oct.*
Beurré St. Nicholas.—*Oct.*
Beurré Clairgeau.—*Nov.*
Beurré Giffard.—*Aug.*
Beurré Superfin.—*Oct. to Nov.*
Brandywine.—*Aug.*
Bloodgood.—*July.*
Buffum.—*Sept.*
Cabot.—*Sept.*
Dearborn's Seedling.—*Aug.*
Doyenné d'Eté.—*July.*
Doyenné Boussock.—*Sept.*
Doyenné d'Alençon.—*Dec. to Mar.*
Flemish Beauty.—*Oct.*
Fulton.—*Oct. to Nov.*
Golden Beurré of Bilboa.—*Sept.*
Kingsessing.—*Sept.*
Howell.—*Oct.*
Lawrence.—*Dec. to Jan.*
Louise Bonne de Jersey.—*Sept.*
Manning's Elizabeth.—*Aug.*
Onondaga.—*Nov.*
Osband's Summer.—*Aug.*
Paradise d'Automne.—*Sept.*
Rostiezer.—*Aug.*
Seckel.—*Sept.*
Sheldon.—*Oct.*
St. Michael Archange—*Oct.*
Tyson.—*Aug.*
Urbaniste.—*Oct.*
Vicar of Winkfield.—*Nov. to Jan.*
Winter Nelis.—*Nov. to Dec.*
Uvedale's St. Germain (baking) *late.*

Pears.

[For cultivation on Quince Stocks.]

Beurré Superfin.—*Nov.*
Beurré Hardy.—*Oct.*
Buffum.—*Sept.*
Belle Lucrative.—*Sept.*
Belle Epine Dumas.—*Dec.*
Beurré d'Amalis.—*Sept.*
Beurré d'Anjou.—*Nov. to Dec.*
Beurré Diel.—*Nov.*
Beurré Langelier.—*Nov. to Dec.*
Catillac, (cooking.)
Duchess d'Angouleme.—*Oct.*
Doyenné d'Alençon.—*Dec. to Mar.*
Easter Beurré.—*Dec. to Feb.*
Figue d'Alençon.—*Oct.*
Glout Morceau.—*Dec.*
Louise Bonne de Jersey.—*Sept.*
Napoleon.—*Oct.*
Nouveau Poiteau.—*Oct.*
Rostiezer.—*Aug.*
Soldat Laboreur.—*Nov.*
St. Michael Archange.—*Oct.*
Urbaniste.—*Oct.*
Uvedale's St. Germain (for baking.)
Vicar of Winkfield.—*Nov. to Jan.*
White Doyenné.—*Oct.*

Plums.

Bleeker's Gage.—*Sept.*
Coe's Golden Drop.—*Oct.*
Green Gage.—*Sept.*
Jefferson.—*Sept.*
Lawrence's Favorite.—*Aug.*
Lombard.—*Sept.*
Munroe.—*Sept.*
Purple Favorite.—*Sept.*
Prince's Yellow Gage.—*Aug.*
Purple Gage.—*Sept.*
Reine Claude de Bavay.—*Sept.*
Smith's Orleans.—*Sept.*
Washington.—*Sept.*
McLaughlin.—*Sept.*

Cherries.

Belle d'Orleans.—*June.*
Belle Magnifique.—*July.*
Black Eagle.—*July.*
Black Tartarian.—*June.*
Coe's Transparent.—*June.*
Downer's Late.—*July.*
Early Purple Guigne.—*June.*
Governor Wood.—*June.*
Elton.—*July.*
Early Richmond, (cooking.)—*June.*
Graffion, or Bigarreau.—*July.*
Knight's Early Black.—*June.*
May Duke.—*June.*
Reine Hortense.—*July.*

Apricots.

Breda.—*Aug.*
Large Early.—*July.*
Moorpark.—*Aug.*

Nectarines.

Downton.—*Aug.*
Early Violet.—*Aug.*
Elruge.—*Sept.*

Peaches.

Bergen's Yellow.—*Sept.*
Crawford's Early.—*Aug.*
Coolidge's Favorite.—*Aug.*
Crawford's Late.—*Sept.*
Early York, *serrated.*—*Aug.*
Early York, large.—*Aug.*

Hill's Chili.—*Sept.*
Large White Cling.—*Oct.*
George IV.—*Aug.*
Grosse Mignonne.—*Sept.*
Morris White.—*Sept.*
Madeleine de Courson.—*Sept.*
Teton de Venus.—*Sept.*
Old Mixon Free.—*Sept.*
Old Mixon Cling.—*Oct.*

Grapes.

[Under Glass.]

Black Damascus.
Black Hamburg.
Black Frontignan.
Black Prince.
Chasselas de Fontainbleau.
Red Chasselas.
Cannon Hall Muscat.
Grizzly Frontignan.
White Frontignan.
White Muscat of Alexandria.
White Nice.
West's St. Peter.
Zinfindal.

[Open Culture.*]

Catawba.
Concord.
Delaware.
Diana.
Isabella.

Raspberries.

Fastolff.
Franconia.
French.
Knevet's Giant.
Orange.
Red Antwerp.
Yellow Antwerp.

Strawberries.

Boston Pine.
Hovey's Seedling.
Burr's New Pine.
Longworth's Prolific.
Large Early Scarlet.
Hooker's Seedling.
Wilson's Seedling.

Currants.

Black Naples.
May's Victoria.
Red Dutch.
White Dutch.
White Grape.

Blackberries.

Lawton's New Rochelle.
Dorchester Blackberry.

MARSHALL P. WILDER,
E. W. BULL,
NATHAN DURFEE,
Committee of the Board.

* The Catawba and Isabella grapes are not suited to general cultivation in any of the New England States, except in warm seasons, and in favorable locations.

A committee consisting of Messrs. Atwater, Brown and Gardner, presented the following

REPORT

ON ROOT CROPS.

Carrots, Sugar Beet, Mangold Wurzel, Swedish Turnips.

The Board of Agriculture, knowing the value of the root crop for stock feeding purposes, its value as a crop in cleansing the land under a course of cultivation; also the economy in the use of root crops in comparison with other crops now cultivated for feeding purposes, and believing that information upon the subject would encourage this general cultivation, asked (by circular letter,) of the farmers of Massachusetts, the following questions, viz.:—

1. The kind of soil, its depth, and the nature of the subsoil on which, according to their experience, the roots above named had been most successfully cultivated?
2. The kind of plough used, mode of preparation of the soil, kind and quantity of manure used, when and how applied?
3. Variety of seed used, where grown, time of seeding, distance apart of the rows, and distance of the roots apart, left in the rows for maturity?
4. Time of harvesting, manner of keeping, &c., &c.?

The answers received show that the practice in cultivation, and the kind preferred, and the estimate placed upon the crop, (for feeding to stock,) is as varied as the soils planted. It has been generally cultivated and fed out without keeping any record of the cost of raising, or of the results in its use. The published Reports of the Board of Agriculture for the years 1851–8, inclusive, and the Industrial Statistics of the State, 1855, give the following information:—

Total Product—Root Crops.

Carrots, 1,469 acres; average yield per acre, 427 bushels, ...	640,500
Turnips, 2,267 acres; average yield per acre, 231 bushels, ...	523,677

Beets and other esculent vegetables, 3,853 acres; average yield per acre, 325 bushels, . . .	1,252,225
Potatoes, 41,982 acres; average yield per acre, 93 bushels, ...	3,904,326
	6,320,728

Head of stock owned in the State, four hundred and eighty-seven thousand—population one million—showing a product equal to about four bushels for every head of stock fed and to supply the wants of one million of inhabitants.

The largest average yield of carrots has been in Hampshire County, 616 bushels to the acre; the soil cultivated, deep sandy loam; eight cords barnyard compost manure used to the acre. The smallest yield was in one of the shore counties, upon a light sandy soil, 220 bushels per acre. The manure used in Barnstable County is six cords of compost of fish, sea-weed, and barnyard manure. The product on one-fourth of an acre thus manured, was reported by Joshua Crowell to be 13,840 pounds of carrots. The cost of manuring, cultivating and harvesting, at $23.35. Value of the crop, at ten dollars per ton, $69.20. Profit on the quarter acre, $45.85. The returns from Hampden County, in 1851, from the accounts kept upon three farms, gave the average cost of raising carrots, at thirteen and one-half cents per bushel. Returns from Hampshire County, in 1852, showed the average cost then to have been (using eight cords manure to the acre,) thirteen cents per bushel. The returns from Worcester County, the same year, show a probable cost of ten cents per bushel for raising.

In Essex County carrots have been cultivated on good land, using compost, six cords to the acre, half leached ashes, the other half barnyard manure, giving a product of 992 bushels per acre. The largest yield stated (in the volumes before mentioned,) in this county, has been twenty-five tons of carrots to the acre, gathered from a loamy soil, manured six cords to the acre, compost half leached ashes and half barnyard manure. The largest yield reported from Hampshire County, 1857, (barnyard compost eight cords to the acre applied to the land,) was twenty-seven tons from one acre. This crop was cultivated in rows fourteen inches apart—hand culture. The carrot crop

is generally cultivated in the State, in rows twenty to thirty inches apart, cultivated with the horse hoe and cultivator. The general statements from different counties (made in 1858,) show a cost of about ten cents per bushel, and a profit of over or about one hundred dollars per acre. The lowest statement made of the cost of *cultivation alone*, upon the very best soil in the valley counties, in a favorable season, and a large yield, was five cents per bushel. Eight cords of manure to the acre is not considered too much, if the greatest economy in the cost of the crop per bushel is desired, (for the cost must be determined by the manure applied to the crop.) In the section where eight cords of manure to the acre has been applied, the greatest yield has been harvested.

The carrot, mangold wurzel, and Swedish turnip have been cultivated in Hampden County, upon one plot of ground in even condition, showing the following results:—

Two rows of the carrots yielded	1,200 lbs.
Swedes yielded	1,420 "
mangold wurzel yielded . .	2,220 "

Two adjoining rows, cultivated in cabbages, yielded 290 merchantable heads. The average yield of mangolds in the State of New York, (where six or eight cords of manure to the acre is generally used, the crop cultivated in rows thirty inches apart,) is twenty to twenty-five tons per acre. The premium on the carrot crop in the State of New York, has been invariably awarded upon a yield of from eight hundred to one thousand bushels per acre, the average cost reckoned at about $12\frac{1}{2}$ cents per bushel. The ruta-baga is there extensively cultivated upon a similar soil with that used for the carrot. The New York State Reports show an increase from year to year in the quantity raised of carrots and beets for feeding to all kinds of stock. The Vermont State Agricultural Society Reports say, that sugar beets, carrots, and ruta-bagas form the principal root crops for feeding purposes. Beef fattened on the beet is more tender and juicy, and sweeter, than when fattened with meal. The editor of the *Plough, Loom and Anvil*, in publishing the answers received to circular inquiries, as to the value of carrots for feeding stock, gives the following opinions: A peck of carrots,

will, with the same quantity of hay, keep working horses in as good condition as (and many say better, than) if fed with the same quantity of oats with the hay; or that a peck of carrots and a peck of oats are equal to a half bushel of oats. The *Germantown Telegraph* says:—

"Carrots possess not only fattening properties equal to oats, but secure to the horse in winter fine health, loose skin, and glossy coat of hair, which it is impossible to produce except by the use of carrots. An acre of land which will produce seventy bushels of oats, will produce five hundred bushels of carrots." John Merrill, of South Lee, says he should prefer one hundred bushels of carrots and one hundred bushels of oats, to two hundred bushels of oats, for feeding to team horses. The experience of J. C. Curwin, of England, in the use of carrots for work horses, corresponds with that of Mr. Merrill. Mr. Curwin employs constantly as many as eighty horses on his farm and about his coal mines. Where he formerly used ten pounds of oats per day for each horse, four pounds were taken away, and five pounds of carrots substituted; and this practice was continued with eighty horses for three years, with complete success; and the condition of the horses improved by the change. *Stewart's Stable Economy*, page 176, refers to the practice of Mr. Curwin. *Youatt on the Horse*, page 400, says, the following account of the value of the carrot is not exaggerated. "This root is held in much esteem. There is none better, nor perhaps so good. When first given, it is diuretic and laxative; but, as the horse becomes accustomed to it, these effects cease to be produced. They also improve the state of the skin." Stewart says, parsnips, sugar beet, and mangold wurzel are occasionally fed. The parsnip is chiefly used in France, but objections are made by Stewart to its use. These objections have been since overruled. The *American Farm Book*, page 179, says: Horses thrive on carrots; and some judicious farmers feed them as a substitute for oats. Their intrinsic value in weight for their fat and flesh forming properties, is less, in the proportion of about five to one. For their medicinal properties, however, and the healthful effects resulting from their regular but moderate use, they would be advantageously purchased at the same price as oats, or even corn, if they could be procured no cheaper. As to the quantity which may be fed

per day, see *Youatt*, also *British Husbandry*, vol. 1, p. 125, and *Complete Farmer*, by Thomas G. Fessenden, p. 169; *Farmer's Instructor*, p. 195, and *Massachusetts Reports*, 1854 and 1856.

Cultivation of Carrots.—The carrot was cultivated in England two hundred years ago. Its cultivation here was begun in Roxbury in 1790, yielding four to five hundred bushels per acre, and considered a necessary crop for the wintering of stock, in the best way. The name of the carrot is derived from the French, carote. The kind which the experience of your committee proves to be the most profitable in cultivation, in deep, sandy, loam soil, is the Long Orange. It can be grown on reclaimed peat lands. On the land described, plough deep, following in the furrow with the subsoil plough. In Holland, where labor is seventy per cent. below the cost in Massachusetts, the farmer finds it profitable to follow the plough with the spade, and deepen the furrow. The first ploughing should be in the autumn; ploughing in two cords barnyard compost manure per acre. Cross plough in the spring, turning in four cords of rotted manure to the acre—roll the ground to even the surface, then spread and harrow in two cords of rotted manure to the acre. Sow about the tenth of May, with seed drill, seed of the previous season's growth. If more than two years old, the seed may not vegetate. If for hand cultivation, sow in rows fourteen inches apart, about two pounds of seed to the acre. If for cultivation with the horse-hoe, the rows should be twenty inches apart. When the plants show themselves, and before the weeds appear, hoe out the rows. Where the rows are twenty inches apart, as soon as the plants have gained strength, run between the rows Knox's horse-hoe. When the plants have four leaves two or three inches long, weed and lightly thin the rows with a triangle hoe. Soon after the condition of the crop will allow, run the one horse subsoil plough between the rows. At the second thinning of the plants, if the greatest yield in weight per acre is desired, leave the plants three inches apart. Continue the cultivation of the crop as its condition shall demand. The White, or Belgian Carrot, will probably yield twenty-five per cent. more in quantity than any other, but is found by experience to be less nutritive. The Short Horn Orange is the variety which has been so success-

fully cultivated on light or shallow soils—overlaying the clayey subsoil. The average yield in Massachusetts (427 bushels per acre) was made up from the varieties cultivated. Of the Long Orange and the White Belgian, the largest yield in England was reported by Lord Ducie, twenty-six tons three hundred weight; by Mr. Harris, thirty-two tons per acre; and in the Island of Jersey, thirty-eight tons per acre.

Sugar Beet.—The sugar beet is equal or next in value to the carrot for feeding to stock, but is not as productive as the mangold wurzel, the ordinary yield being about seventy-five per cent. of the mangold; but its value is doubtless underestimated rather than overestimated. The ground in preparation should be in as high condition to receive the seed, as is required for the carrot. The following experiment in growing the sugar beet indicates the manner of cultivation most profitable.

A square rod, where the plants were left one foot apart each way, yielded	192 lbs.
One and a half feet apart, one square rod yielded, .	235 "
Two feet apart, one square rod yielded . . .	305 "

The sugar beet is cultivated in Essex County, seed sowed by hand, in rows two feet apart; the plants left for maturity, nine inches apart in the rows. The product on one-half acre, well cultivated, was 460 bushels, weighing 22,585 pounds.

The Mangold Wurzel.—(*Beta vulgaris campestris*, which signifies root of scarcity,) was cultivated in Germany one hundred years ago, was introduced into England seventy or eighty years ago, and into Massachusetts some thirty years ago. On *every farm* where it has been introduced as a crop in rotation, and where there is stock to be fed, its cultivation has been generally continued. It may be cultivated on a variety of soils, but it gives the greatest return "on a deep, friable loam in good condition, and which contains a considerable quantity of vegetable or organic matter." For deep soils in high condition, the long, red variety should be preferred; for shallow soils, the globe variety will give the greatest yield per acre. Prepare the land in the manner

described for carrots, also using eight cords of manure to the acre. Sow the seed (from the tenth to the twentieth of May,) in rows thirty inches apart, as soon as possible after the last stirring of the earth in preparation. Seed sown in *fresh earth* will germinate much sooner than when sown in the sun-dried soil. One inch covering of the seed is better than a deeper covering. Time of sowing and the depth of covering must be regulated by the weather. Seed must not be sown until severe frosts are over. When the temperature of the ground is such as to induce an immediate germination of the seed, plant it, keeping in mind also the fact that the mangold, if sown too early, will incline to grow a seed stalk rather than to develop its strength in root. In ordinary seasons, the plant will show itself within two weeks from the time of sowing the seed. The soil must be kept free from weeds, and in a condition to drink in the rain and the dew. When the plant shows a strong leaf, thin out the backward plants, leaving the roots six inches apart in the rows. At the second thinning, early in July, if you wish to grow mammoth roots, leave the plants twelve inches apart in the rows. Medium sized roots are equally good, and will mature if left ten inches apart in the rows. Your committee have reason to believe that plucking the leaves of the mangold wurzel before the root reaches maturity, checks its growth. It is possible, but not probable, that nature furnishes a surplus. "A square rod, where the leaves had been so taken, yielded one hundred and seventeen and a half pounds," and the adjoining rod, where the leaves had been left, yielded one hundred and fifty-seven pounds. The one-horse subsoil plough may be run between the rows during the growth of the crop with advantage. The crop should be gathered before frosts come. Your committee would here refer to vol. 1858, p. 210, Report of the Board of Agriculture, where the manner of growing the mangold wurzel in England is fully described. The mangold wurzel is next in value to the sugar beet for feeding purposes.

Swedish Turnips.—The ruta-baga. A sandy or gravelly loam is to be preferred for this root. The soil should be in good condition, and manured six cords to the acre. If the land has been previously thoroughly cultivated, one ploughing

will answer. Follow ploughing with the roller and harrow. Sow the seed from the seventh of June forward to the thirtieth, with seed-sower, in rows thirty inches apart. The horse hoe or cultivator should be sent between the rows two or more times, according to the season and the condition of the soil. When the plants show two or three leaves, the rows should be thinned out, leaving the plants to stand six or eight inches apart in the rows. The scuffle hoe is the best for first and last hoeing. The earth must not be heaped about either of the roots spoken of in this report. The product under good management, and with a favorable season, is seldom less than six hundred bushels per acre. The tops from an acre are worth more for feeding than their weight in good grass. The ruta-baga is a slow grower. It does not produce so much weight per acre as the common turnip—is less laxative; and it is generally acknowledged that twenty tons of ruta-bagas are worth, for feeding, thirty tons of the common turnip. The ruta-baga is more fattening than milk producing. Corn will not thrive when following the ruta-baga. It is said that wheat will follow it, producing a better yield than when planted after white turnips. Carrots may follow turnips. The land is cleaner than after a corn crop.

Manures.—If green manure is used in preparing the land for root crops, the labor in cultivation will be fourfold. If, with the manure, the seeds of weeds be deposited in the soil, they will outgrow the seeds of all hybridized plants. Whether it is expedient for farmers to wait for the manure of their barnyards to become thoroughly rotted before they begin to grow root crops, or expedient for them to purchase in the interim guano, &c., &c., to manure their lands, thus avoiding the danger of sowing weed seeds,—they can best decide. Guano (and all manures which contain phosphates) is a profitable addition to the soil devoted to the root crop. The best extra applications are, dissolved bones, "bone dust," "bone powder," or guano, which contains a large per cent. of phosphates. Phosphates are indispensable to the growth of roots.

Experiments in Feeding.—Mr. Howdoin, of Scotland, in 1832, made the following experiment in feeding with mangold wurzel,

Swedish turnips and potatoes; the product of two acres of mangold wurzel, fifty tons; five acres Swedish turnips, one hundred and forty tons; two acres potatoes, twenty-nine tons, four hundred weight. The experiment was made with twenty-one head of cattle, which received, in addition to the roots, a few distillers' grains, and a little straw.

	Lot No. 1, from one acre Potatoes, one acre Mangolds, one acre Swedes.	Lot No. 2, from one acre Potatoes and two acres Swedes.	Lot No. 3, from one acre Mangolds and two acres Swedish turnips.
	Girth.	Girth.	Girth.
1831, November 30, . .	35 ft. 8 in.	35 ft. 9 in.	35 ft. 8 in.
" December 30, . .	36 ft. 6 in.	36 ft. 7 in.	36 ft. 6 in.
1832, January 30, . . .	38 ft. 2 in.	38 ft. 4 in.	38 ft. 2 in.
" March 1, . . .	39 ft. 7 in.	39 ft. 8 in.	39 ft. 6 in.
" March 30, . . .	40 ft. 8 in.	40 ft. 10 in.	40 ft. 6 in.
" April 30, . . .	41 ft. 4 in.	41 ft. 7 in.	41 ft. 3 in.

Forty-one tons Swedish turnips and mangold wurzel, withdrawn and fed to other stock; on the 30th January Mr. Howdoin took a pair of cattle from each lot, and fed No. 1 with potatoes and water, No. 2 with Swedish turnips, No. 3 with mangold wurzel. The following shows the relative increase in girth in *three months* :—

	Lot No. 1, Potatoes.	Lot No. 2, Swedes.	Lot No. 3, Mangolds.
1832, January 30, . . .	10 ft. 8 in.	10 ft. 5 in.	10 ft. 4 in.
" April 30, . . .	11 ft. 6 in.	11 ft. 3 in.	11 ft. 2 in.

When the cattle were sold, purchasers agreed that the lot fed on Swedish turnips were from seven to ten shillings sterling a head better than the other lots. The average advance upon the original value of each, was six pounds twelve shillings, and the cost of grain deducted. There remained one hundred and

twenty pounds sterling (at £480 sterling,) $576 (five hundred and seventy-six dollars) return for the product of eight acres in roots, after withdrawing forty-one tons—which were fed to other stock. The labor compensated by the manure made for the farm.

Root Crop of England.—By the returns made to the British Parliament, of the annual agricultural products of the kingdom, the turnip crop, for all its uses for men, cattle, &c., was set down at one hundred and fifty millions of dollars.

The farmers of Massachusetts who have cultivated the past season large crops of roots, (when the surface crops were generally short, and the root crops yielded abundantly,) have been able to easily winter the stock of their farms.

The analysis of roots, such as the beet, carrot, parsnip and turnip, showing eighty-five to ninety per cent. of water, does not prove the crop to be of as little value as has been inferred from this fact alone. The remaining ten to fifteen per cent. is nutritive matter. Twenty tons of turnips is not an uncommon crop on one acre of good land. If these contain but ten pounds of solid matter in every one hundred pounds, the aggregate amount from twenty tons would be four thousand pounds.

Thirty bushels of wheat to the acre (sixty pounds per bushel.) would give but eighteen hundred pounds. The dry matter of the turnip is nearly as fattening as wheaten flour. The comparison shows a double return per acre. When the average yield of corn is but thirty bushels to the acre (fifty-six pounds to the bushel,) sixteen hundred and eighty pounds, the turnip crop, ordinarily yielding five hundred bushels to the acre, is more profitable to the farmer. While the carrot and the beet have eighty-five per cent. of water, the bread made by bakers in our cities from Southern flour, contains about fifty per cent. of water.

Dr. Voelcker says: there is a general resemblance in the composition of parsnips and carrots. Parsnips differ in composition from carrots, by containing less sugar, which is replaced by starch. Parsnips contain, on an average, eighteen parts of solid substances, carrots twelve parts. The woody fibre in parsnips, carrots, turnips, mangolds and Swedes, is, without

doubt, converted in the stomach of animals into gum and sugar, and applied in the system to feed the respiration, or for the laying on of fat. Mangolds are almost as nutritious as carrots for fattening animals. Mangolds should not be given to ewes when in lamb, nor fed to horses when carrots can be had. Roots of any kind, when fed to stock (especially horses) in a very cold, frosty state, will have a tendency to gripe, and almost certainly scour the bowels.

The yield of the root crop will be invariably foretold in the quantity of manure applied, and the manner of cultivating the crop. The roots spoken of in this Report have all been brought from a wild state to their present condition. If placed by the farmer in an uncongenial soil, the plant must be fed with the food necessary to nourish it into growth. If not properly manured and properly cultivated, the crop fails, and the climate is blamed in consequence.

Preserving Roots.—Chaptal's Chemistry applied to agriculture, chapter on the preservation of animal and vegetable substances, remarks as follows: The nature of all bodies which have ceased to live or vegetate, is changed as soon as the physical or chemical laws by which they were governed cease to act. The elements of which they were composed then form new combinations, and consequently new substances. While an animal lives or a plant vegetates, the laws of chemical affinity are continually modified in its organs by the laws of vitality; but when the animal or plant ceases to live, it becomes entirely subject to the laws of chemical affinity, by which alone its decomposition is effected. The principles of the atmospheric air which is imbibed by the organs of living bodies, whether animal or vegetable, are decomposed and assimilated by them, while dead bodies are decomposed by its action. Heat is the most powerful stimulant to the vital functions; yet it becomes, after death, one of the most active agents in the work of destruction. Our efforts, then, for the preservation of root crops ought to be directed to counteracting or governing those chemical or physical agents from the action of which they suffer. All the methods which have been successful, have been formed upon this principle. The chemical agents which exert the most powerful influence over the pro-

ducts of the earth, are air, water and heat. The action of these, however, is not equally powerful over all classes of plants. The soft and watery, and those which approach the nearest to animal matter, decompose most readily; the action of disorganizing agents upon them is prompt and effectual. In secluding the substances to be preserved from contact with the destructive agents mentioned, they will be preserved. In all vegetable products, water exists in two different states, one part of it being found free, and the other in a state of true combination; the first portion not being confined, except by the covering of the vegetable, evaporates at the temperature of the atmosphere, (the reason why vegetables and fruits shrivel when exposed to the air); the second is set free only at a temperature sufficiently high to decompose the substances containing it. The first, though foreign to the composition of the vegetable, enters into every part of it, dissolving some of its principles, serving as a vehicle for air and heat, and being converted by cold into ice. By these several properties it greatly facilitates decomposition. The second portion, from which no evil of the kind arises, is found combined and solidified in the plants, and its action is thus neutralized.

By increased attention to the cultivation of roots for family use (the subject of inquiry in the circular issued by the Board of Agriculture) the consumption of animal food, especially salted meats, will be less, and the cost of living lessened. The crop of the garden, if duly tended, will generally give a fourfold return for the labor, if compared with the labor bestowed upon other crops. There are many instances where the cultivator of six acres of ground cultivated in vegetables for a market, receives a larger net return for his year's labor, than is received from many farms of one hundred acres.

The method of harvesting, the manner of keeping, the diseases to which the crops named are subject, and the remedies which have been found for these evils, with references to other varieties of vegetables, particularly worthy of commendation —will be the subjects of the following year's report.

George M. Atwater,
Simon Brown,
Edw. W. Gardner.
Committee.

The committee appointed to consider the subject presented the following

REPORT

ON MARKET DAYS.

The committee of the Board of Agriculture appointed for the purpose of encouraging the institution of "Markets" throughout the State, have the honor to report, that, in accordance with the recommendations of the Board, expressed in their votes, your committee distributed the following circular:—

At a late meeting of the Board of Agriculture it was

Voted, That this Board recognizes the great importance of establishing frequent Markets or Fairs for the sale of agricultural products.

Voted, That the subject be brought before the county agricultural societies, with the request that they will take early steps for the establishment of markets within their respective districts.

Voted, That the secretary communicate the above to the several agricultural societies.

This Board, recognizing the importance of establishing frequent markets throughout the Commonwealth for the sale of agricultural products, have appointed the undersigned a committee, for the purpose of securing the united action of those interested in the subject towards the attainment of this object. By a vote of the Board, which is herewith submitted, the county agricultural societies are invited to take such action as will forward this important movement within their several neighborhoods. So important, however, does it seem to the undersigned to secure an early accomplishment of this measure, that, not contenting themselves with forwarding these resolutions, they have presumed to accompany them, with a few comments which they deem to be pertinent to the occasion. They likewise invite your attention to the prize essay, by Mr. Allen W. Dodge, in which the whole subject is fully and ably discussed; and they hope, by thus spreading the whole matter before you, that it will receive your earnest and thoughtful consideration.

Unlike most projects of amelioration and improvement, this involves no expense, and no working system or machinery requiring money or time to put it in operation, and but little change in the existing order of things. It amounts simply to this — that the farmers of a neighborhood, larger or smaller in extent, according to circumstances, shall agree to meet together on certain days, and at a certain place, for the disposal of their agricultural products;—that instead of peddling them out as they

do now, or selling to such chance customers as may come along, they will conduct their business generally with reference to these market days. Every farmer has, from time to time, more or less business to transact, which has nothing to do with the sales of his crops;—estates are to be settled, money is to be paid or received, town or county business has to be attended to, and numberless small transactions occupy much of his time. By common consent at first, and afterwards from its manifest convenience, these transactions would all take place on market days, and the saving of time in this particular alone would be ample compensation for their establishment; and when once the habit had become settled, the farmer would look forward to market day next to his weekly day of rest, as the pleasantest and most useful in the year. Besides purchasers that would attend from a distance to supply larger markets, sellers also would visit these markets to meet the wants of farmers. Agricultural implements, especially those in most constant use, and those also that possessed any new merit or advantage, would find their way to these markets; in short, all that a farmer needs in his business, would come to him upon these occasions. Farm laborers would seek this opportunity to get places, and both the employer and the employed would be able each to procure what was best suited to his wants.

These market days have been established for a long time over the continent of Europe, and all agricultural products are sold or bargained for upon these occasions. In England they have existed since the time of Alfred the Great; and to their greater frequency and number in that country may be ascribed, in a great measure, its superiority in the art of agriculture over all other nations. They have made the English farmer a man of business as well as a mere cultivator of the soil. They have been the means, by bringing him constantly in contact with those engaged in the same pursuits with himself—each seeing what the others were doing—of spurring him on to improvement, and of preventing that isolation, the natural tendency of agricultural pursuits, which is the bane of all progress. One of the undersigned has resided in an agricultural district in England, and has familiarized himself by careful observation with the general system of English agriculture, and he could find nothing to account for its greater profitableness as compared with ours, except in the fact, that every farmer has a ready market close at hand for what he may produce, and the power of adapting his cultivation to the knowledge he has of his market. He has only to ascertain the prices obtained in the great markets, and with this knowledge he knows what is a fair price in the one where he sells. He makes his money crop of beef, mutton, grain, butter, cheese, or other product, according to the nature of his farm and of his market, and he so manages his business with reference to the market, as to sell with the least possible expense in time and trans-

portation. For example, he may have fat cattle ready for the butcher; there are certain market days, well known and established, when the London butcher attends to make his purchases. He may not even drive his cattle to market, but may bargain for them to be delivered at a given day. Or he may have a crop of oats, this he may sell by sample; and thus save the cost of transportation, in case the market happens not to suit his ideas as to price. This is briefly stated to show the benefit of system in comparison with our desultory method of hunting up purchasers, as is now the case. On a well-established, well-known market day, buyers and sellers meet together; fair prices are at once established, and no time is lost, no needless expense incurred, by searching here and there for what may be easily and cheaply brought together under a proper system.

Massachusetts is as favorably situated as England is for the establishment of markets. Her manufacturing cities, towns, and villages are spread as thickly over the State, and the consumers are far in excess of what is supplied from the soil. All that is needed on our part is to create unity of purpose and of action on the part of consumer and producer. The cost of bringing the article produced to the consumer would, in a vast number of cases, afford an enormous profit to the producer. All this he could not be expected to get, but it would be divided between the producer and the consumer. The turkey that is picked up by a travelling buyer throughout our country towns, at 75 cents, finds its way to Faneuil Hall, and the consumer there willingly pays $1.50 for it; the difference is the cost of getting it to market with one or two intermediate profits, which are by this method unnecessarily added to it. If the purchaser for the Boston market could have attended a country market on a *poultry day*, when all who had it for sale for miles around attended, he could have afforded to have given $1 for the turkey, and have sold it in Boston at $1.25. This is a supposed case; but at the same time it is one which every farmer will admit to be justified by experience, and it is adduced to illustrate the general principle, that the producer pays the principal cost of transportation. A farmer in Berkshire county can get no more for a turkey in Boston market than one who brings it from Chelsea; but if he has a market for the turkey near home he is sure of getting the Boston price, less a very moderate cost of transportation. This cost is always less in proportion to the amount, and the expense of collecting the requisite quantity to make the transportation cheap, is almost entirely saved by having it brought to a central point.

The value of farming property depends very much upon its proximity to a quick and ready market, and hence it is that farms in the neighborhood of large cities bear so much higher prices than those which are remote. But even those most favorably situated in this respect would be

benefited by regular market days. Even the little county of Middlesex, in England, of only half the size of our own county of the same name with the city of London and its two million of inhabitants in her borders has five regular markets, besides the great ones at Smithfield and Covent Garden. So, too, notwithstanding the great manufacturing towns all over England, each a large daily market of itself, yet every thirty-five thousand square acres of agricultural property in that favored region is blessed with regular market days. It is sometimes said that a man may walk through England, and attend a market fair every day in the year.

We have dwelt upon the example thus furnished to us by England because of the similarity of that country to our own State, as it respects the consumers of agricultural productions, both having a large manufacturing population; both consuming in excess of production. We offer her example in this respect for imitation. We are fully convinced that we do not overrate the importance of the proposed measure. We believe, that if adopted, it will have the effect of introducing a better and more profitable system of farming; that farmers will learn thereby what are the most profitable objects of cultivation; that they will acquire a better knowledge of economy in conducting their business; that they will learn to adapt their operations more intelligently with reference to those general laws of trade which determine the success of every other branch of industry; that they will find mutual advantage in comparing frequently the results of their labors, and that they will have the constantly increasing pleasure of frequent intercourse, so advantageous to men engaged in a common pursuit.

Your attention to this subject, and that of the agricultural society in your neighborhood, is earnestly requested. The committee are of the opinion, that by the conference of the trustees and members of our agricultural societies, upon the expediency of these fairs, by town or district meetings, and more than all, by the zealous co-operation of all individuals who, after full investigation, feel the importance of the subject, much may be accomplished. The undersigned would be happy to receive any communications or suggestions upon this topic, and will readily engage, so far as their time or other engagements will permit, to give their aid to such measures as may tend to secure this great benefit to the farmers of Massachusetts — the establishment of regular "Market Fairs" throughout the State.

Richard S. Fay,
Charles G. Davis,
William Sutton,
Committee of the Board.

Boston, March 1, 1859.

In addition to the publication of the valuable prize essay upon "Market Days," by Mr. Dodge, in the Annual Report of the Secretary of this Board, for the year 1858, five hundred copies of that essay were published and appended to the above circular.

Your committee, in the month of April last, had the pleasure of meeting the trustees of the Essex Agricultural Society, before whom the subject was fully presented. The trustees took a cordial interest in the subject, and voted to hold a "Market" at South Danvers on the 16th of May. This was followed by others at North Andover, near Sutton's Mills, May 20, at Georgetown, June 21, and another at Newburyport; again at North Andover, on the Green, September 13, and a second at South Danvers, October 11. For an account of these markets, the committee refer to extracts from the annual report of the Essex Society, in the Abstract of this year.

The markets at North Andover, at Georgetown, and the last one at South Danvers, were very injuriously affected by the rain, but notwithstanding these impediments, and the disadvantages of novelty and inexperience, the markets have succeeded as well as your committee had reason to expect. "So far as our observation has extended," say the committee of arrangements for the market at South Danvers, "we think there is a strong desire in the community that these markets should be established."

It was not thought expedient to urge the institution of markets in other counties until the experiment had been tried in the county of Essex. In the month of August the committee had the pleasure of presenting the subject to the trustees of the Agricultural Society in the county of Plymouth, who voted to hold a market at South Abington, near the railway station, on Friday, the 14th of October. This market was highly successful; many sales of stock and produce, and many exchanges were made, and the people of the county took great interest in the project. So great was the interest of the farmers, and so well convinced were they of the benefits of stated markets, that they expressed a desire to hold regular monthly markets upon the first Tuesday of every month. A second market was accordingly held on the second Tuesday of November—the first Tuesday being the day of the State election—and a third was

advertised for the first Tuesday of December, which was entirely prevented by a violent storm. A market was also held on the second Tuesday of November, at North Bridgewater, and the committee are informed that it is the intention to continue these markets in the spring, at South Abington, on the first, and at North Bridgewater on the second Tuesday of every month.

Markets have also been held at Springfield, some time in the first week of May, at Concord, September 28,—the day of the annual exhibition of the Middlesex Society,—at Framingham, on the 11th of October, and at Sturbridge, in Worcester County, November 16.

And now the inquiry will be renewed, what, with the additional experience and observation of the committee, do they still deem the great advantages of these markets? Can they be inaugurated, and how and where may they best be instituted? Our reply to these inquiries will be brief.

And, in the first place, the committee have the pleasure of stating that their confidence in the vast benefit of these markets to the consumer, as well as to the producer, has not diminished, but has been strengthened by what they have seen and heard during the year. In England there are about eleven hundred and forty markets in a year, and more than one thousand markets, at as many different points, are established by law, as stated in the circular. Some of these statute fairs, or markets, date back to the time of King Alfred,—more than ten centuries ago,—and they have ever since been increased both by statute and by the voluntary efforts of the various sections. To those who doubt the benefit on property of establishing these markets in this country, we put this simple question. How happens it that these markets have so increased by voluntary action and by act of Parliament, if they are not of great advantage to the vast producing and landed interest of England? If advantageous there, is there any thing in our condition which would render them useless or less beneficial as we are situated in Massachusetts? Great Britain stands at the head of all the nations in the art and the profit of agriculture. In many respects Massachusetts is admirably situated for the profitable pursuit of agriculture. We have, as in England, a large population of consumers, who are not producers.

The industrial products of Massachusetts are more than two hundred and ninety-six millions of dollars, of which forty-nine millions only come from the soil, including two and one-quarter millions in stone, coal, and marble, and in some countries the proportion of agricultural to industrial products is much less than is shown by the aggregate of State products. We have, therefore, a large and near home market for our agricultural products,—a market for much more than we raise; and at higher prices to the consumer in the large towns and cities, than obtain in any quarter of the world. With many articles of agricultural production we have also a demand which cannot be interfered with from more distant points; with others, competition from a distance is only instituted where the highest prices can be obtained, and then in early summer, on account of the neglect of culture in Massachusetts. We have a good soil, too, notwithstanding the continual cry, in which we all seem to join, of "barren and rock bound New England." The light soils of New England, we maintain, may be worked by thorough and systematic culture, with less labor, and better returns than the heavier soils of what are usually denominated more favored countries. We except only rich alluvial deposits of some sections. We have a climate as good as any in the world. Labor is higher than in England, but not so high as in other sections of our own country, in proportion to the value of the product. But we have not learned to reduce the cost of labor by the introduction of labor-saving machinery, in which, notwithstanding our aptness at invention, we are behind many other countries. Nor have we learned to reduce this cost by a judicious division of labor, by systematic culture, and rotation by thorough cultivation of larger fields to a single crop, and by saving time and labor in getting produce to market. We have a right to claim at least as great a degree of intelligence, skill and economy, as we grant to our mother country. The richest agricultural districts in England have a natural soil no better than our own.

Why, then, does not our Commonwealth vie with England in its herds and crops? England has milder winters and a climate more moist than ours. But most crops suffer there from a clouded sun and excess of moisture, and this superabundance

of moisture surely counterbalances any evils which may arise from occasional droughts in this country. Our crops are more sure than English crops, and our animals subject to fewer diseases. English winters are milder, but the best farmers stall feed throughout the winter months. There are no winter crops in England, and the only advantage of a milder winter is the additional labor in some departments of agriculture, which may then be performed. But no good farmer here can be idle in winter; he has enough to do in Massachusetts. During the four last years not an hour has passed, except an occasional day, when it was too cold for out-of-door work, when the farmer could not work upon his meadows and swamps, his peat bogs and his ditches, and could not improve the best land upon his farm. The English farmer pays from five dollars to twenty dollars an acre for rent of arable land, and he makes money. How is he enabled to do this? and why is our agriculture less lucrative and productive? It is owing to the difference in the market system in the two countries, more than to any other cause. It may be said that it is owing to want of capital, ignorance of system, the necessity of planting a little of every thing, size of fields, want of thoroughness of culture, or various other wants and defects, which all our farmers experience, and all this may be true. But your committee believe that the organization of stated markets throughout the Commonwealth will do more, not only to bring the crop economically to market, but to do away with these wants and defects, than any other single influence.

Let us look at the methods usually resorted to among our farmers for the disposal of their products. Except upon dairy farms, and upon those which supply some neighboring city with fruits and vegetables, our system of husbandry has become a very mixed one, from the want of a ready and open market. Farmers, as a general rule, raise a little of every thing, and have of course a little, and but a little, of every thing, to sell. At one time it is a cow, at another a calf, at another a few bushels of potatoes, or a firkin or two of butter, and so through the catalogue of agricultural productions. Now any business man, any one who has been concerned in manufactures or trade, knows well enough that the more varied the product, the greater is the amount of skill and economy

required to avoid failure. He knows that to produce cheaply, he must produce largely of the fewest possible articles. He cannot manufacture hoe-handles and shoe-pegs at the same time. He brings all his forces and energy, all his skill and capital to do one thing well, and to have, as the end and object of his labor, but one article to sell. The same policy should direct the farmer. He ought to cultivate his farm with a view to having but one crop to sell, and all his agricultural operations should be directed, as nearly as possible, to produce the largest and the best of its kind, and this crop should be one for which there should be a convenient market. But how is it in practice?

If a farmer has a dairy cow to sell, for example, or his neighbor wishes to purchase, unless within a short drive of Brighton or Cambridge, both poor markets for that class of stock, they are obliged to seek a purchaser or seller among neighbors, or wait the passing of some chance drover to take the animal off, frequently at less than its real worth, or to sell an animal he knows nothing of. There is no market where such animals are gathered together on a given day, and which, from this fact being known, brings a large number of purchasers as well as sellers together; from the uncertainty, therefore, of finding a ready purchaser at a fair price, the farmer feels no inducement to raise stock. So with root crops —they are a bulky article, and most of them should be used upon the farm and converted into money by feeding to cattle and sheep; the want of a good market for the latter tends to neglect of their cultivation, to the great injury of agriculture.

Nor is this all. We think it will be conceded that by meeting often, once a month, or once a fortnight, persons from a larger extent of territory, with various experiences and knowledge of agricultural wants, and agricultural production, in the sharp competition of traders, the following results will ensue.

Farmers will learn to adapt their cultivation to the market. They will learn to cultivate that kind of merchantable product for which their farm is best adapted. One man has a farm with little or no pasture, suitable to large crops of hay, grain or roots; another has a farm hilly, rocky, difficult to cultivate, better adapted to pasture. The product of these

farms united, would be readily turned into money, with a market. One would raise hay or roots, or fatten cattle, and the other would keep a herding and grazing stock. And the owner of each would buy of the other what he could not raise so cheap as the other. Both farmers now raise a little of both.

In the next place, it seems clear that the farmer will have to cultivate his land more highly and judiciously for the particular crop he is raising.

He will learn to cultivate it more economically, inasmuch as his attention will be more turned to a specific department of husbandry. He will learn to adopt all the advantages of system and division of labor, which are found in all other pursuits.

He learns more from his brother farmers than he has now opportunity of doing. He has a farmers' exchange, which is as much needed in its way, as the merchants' exchange, or the shoe and leather dealers' exchange are needed in another direction.

See how the butcher boy learns to judge of fat cattle by his experience at Brighton, and you have an example of what every farmer and every farmer's son may learn in selecting dairy stock, fat cattle, fruits, and all other stock and products, by a stated weekly or monthly market.

He puts his produce, butter or cheese, the work of his hands, his potatoes and vegetables, the products of his skill, into immediate competition with his neighbor, and if his neighbor gets a higher price he is at once incited to do better. He sees the reward of increased application or skill before his eyes in immediate returns of dollars and cents.

By his market he is instrumental to a much greater extent in establishing prices. He was formerly at the mercy of the forestaller. But he has destroyed the forestaller by meeting the consumer face to face, or by dealing with the city butcher or produce dealer, who is saved the expense of employing a forestaller. But these benefits are not confined to the producer. The country consumer has a larger and better market. He purchases a better and a fresher article at first hands, before several profits are made upon it. It may be argued that he may now in many cases purchase at his own door of the farmer himself. This is true. But he must pay the

farmer an increased price for his labor in peddling the article from door to door. But let the farmer be sure of his market, and that in a cheap and expeditious manner, and he is incited to a more extended culture. The great drawback to many farmers consists in this: that they fear to raise more roots and vegetables than their own stock can consume, on account of the uncertainty and expense of marketing—not that there is not demand for more than can be raised in Massachusetts, but solely because there is no farmers' exchange for their disposal. But it may be readily seen that if the results which we have indicated would follow the institution of markets, the demand among the producers themselves would be vastly increased. For if one would raise more cattle if he could get the roots, the other would raise more roots. And if one would fat more cattle, if he could buy the stock for the stall, and could save his land which he now grasses, he would raise more grain and roots, and buy more cattle.

If we have thus been enabled to convince the doubting of the advantages of markets, permit us to turn their attention for a moment to some practical suggestions with regard to them. And in the first place we would urge that it is not a holiday that we would institute, nor holiday sports. We do not recommend "fairs" in the sense in which the term is generally understood in this country, but purely business days. Owing in part to their novelty the markets which have been held, during the year, have attracted a crowd who were neither buyers nor sellers, but who came to be pleased; and the grotesque number of monstrosities, monkey shows, fandangoes, and noisy soap and razor strop auctioneers which have appeared, seemed to understand the taste of the masses; and they bid fair to drown the bellowing of the oxen, and the meeker moanings of the dairy stock. All this we would discourage, and if the institution of markets should meet the approbation of the legislature, some legislation upon this subject, vesting greater and special powers in the town officers, or in the clerk of the market, may become necessary.

We would recommend to farmers who are disposed to favor the institution of markets to refuse, as a general rule, to sell from their farms those articles which are the subject of market sales. By so doing all the butter and cheese, poultry and eggs,

potatoes and grain, and winter fruit which are produced in Massachusetts, might be sold in an hour at market, and a great saving of time and labor might be made by the farmer.

In some sections of the State we find a farmer of an established reputation, with a fine farm, well cultivated, and situated not far from a village, who says he can readily sell at his door all he desires to dispose of. He does not feel the need of a market. There may be a few such instances; but the mass of farmers, we believe, suffer greatly from the want of a "market," and if the large farmers who do not feel this want, would decline to sell from their farms, they could institute the "market" almost in a single season.

But we are confident that there is no farmer in the State who would not feel the benefit of a market. He is now called by the butcher from his meadow or his plough, one day to sell a calf, the next day, a fat ox, the next day, a pig. One man wishes to buy hay, to trade for a cow, or to buy his crop of apples or potatoes, or another calls him for an hour to sell him what he does not want. But if he wishes to purchase a cow or an ox, a horse, or any other indispensable article, he has to look for it, and perhaps to scour the country round at the loss of much valuable time. Give him a near and ready market, where he can buy as well as sell, and he surely feels the advantage in common with any other citizen. But the benefit does not end here. In a short time he will reduce his farm to a few crops and a more special culture, and will find the farm which he now deems profitable and satisfactory, not a daily burden, with its multitude of various and harrassing cares, but a pleasure and a profit which he now knows little of.

The committee are satisfied from the experience of the year that a "market" should be held in the neighborhood of a hotel, or other place of daily resort, where refuge and refreshment may be had both for man and beast. They should be held as often as once a month, in all cases. But how can they best be inaugurated? This is our recipe.

Find a broad street with an open field on either side, inclosed by wooden fences. The owners of these lots will furnish them gratuitously for the uses of the market. Let them receive their compensation in a very small fee for every animal entered for sale, and a very large one—the more the better—for such

ground for every showman who takes advantage of the market. Let him furnish pens, of the common post and rail, around the inclosure, the fence forming one side of each pen, and a clerk with whom all articles and stock should be entered, and who will take the entrance fee.

In this manner any farmers' club or committee may start a market, which will pay for itself and all expenses of advertising.

In England the local farmers' clubs hold fairs or exhibitions on market days, and in connection with the market; and we doubt not but that some of the farmers' clubs now forming over the State, would find pleasure as well as profit, in villages suitable to the institution of a market, in getting up a "market." To this market they might give the aid of an exhibition of their farmers' club in spring and fall, or once a year, as they see fit, and reports of the club upon the stock and produce at the market would furnish valuable information and increased interest in agricultural pursuits.

We have been thus particular about the details of the manner of getting up a market, because we believe that, after all, the difficulty is not to satisfy the people of Massachusetts that markets would be a blessing, but in prevailing upon them to undertake the task. "It is the first step which costs," is the familiar proverb. But here there is no cost but the effort of the will. Let a few enterprising and public spirited individuals in each county, an agricultural society, or a farmers' club, resolve that they will "plant" a market within ten or twelve miles of every farmer in their county, and they will do a work which will be worthy of the highest honor. With a little effort it can be surely accomplished, and what will be the results?

1. Greater convenience in buying and selling than we now enjoy.
2. A great saving of time.
3. Cash for all things sold.
4. The removal of middle men, thus bringing the consumer and producer face to face.
5. As a consequence of this removal, better prices to the farmer, and cheaper purchases to the consumer.
6. The abolition of the peddling system.

7. More uniform prices, and a better and certain knowledge of market prices.

8. An increase of social intercourse among farmers.

9. More knowledge, by meeting people from a larger extent of territory, and comparing products, and experience.

10. A more extended interchange of products among farmers, by which each can sooner learn what he can buy cheaper than he can raise, and also have better means of making the necessary purchases and exchanges.

11. As a consequence of the above, greater division of agricultural labor among farmers, and more skill and profit, each devoting himself more to a single branch of agricultural production.

12. Additional stimulus to do better by seeing a better article obtain a better price, and consequently a better and more thorough culture throughout the land.

13. By bringing the city produce dealer to the market, making the productive farm, remote from Boston, nearly as valuable for agricultural purposes as a farm or market garden in the neighborhood of a city.

14. Additional facilities for the employment of labor.

15. Additional facilities for the transaction of business generally.

CHARLES G. DAVIS,
R. S. FAY,
WM. SUTTON,
Committee of the Board.

At a meeting of the Board held at the State House in Boston, on the 29th of November, 1859, a committee was appointed, consisting of Messrs. Bartlett, Fisher, Brown and Grennell, to consider what action should be taken in compliance with the Act of the legislature for the encouragement of farmers' clubs. That committee, after deliberation, submitted the following

REPORT:

That the chief, perhaps the only object attempted at this time should be the establishment of farmers' clubs and the aiding of those already established. The committee are not

able at this time to recommend any detailed course of action for adoption, but advise the choice of a committee of three by ballot, who, with the Secretary, shall have full power to carry out the provisions of the Act as they may think proper. That committee should have the plans, constitutions and by-laws of the various clubs already organized, and should endeavor to attain as much uniformity as possible in those hereafter formed.

Each member of the Board should give notice in the various towns in the limits of his society, of the desires of the Board to establish farmers' clubs and of the benefits to be derived therefrom.

John C. Bartlett.
Jabez Fisher.
Simon Brown.
James S. Grennell.

The committee recommended in the above report was constituted by the election of Messrs. Bartlett, Clark and Bull. This committee suggested that the following circular be sent to one or more farmers in every town in the State:—

Dear Sir,—The legislature, by the Act of 1859, chapter 203, proposed to offer some encouragement for the establishment of farmers' clubs in the various towns in this Commonwealth, and, to some extent, to aid those already established. The committee of the Board appointed to make provision for carrying the aforesaid Act into effect have instructed me to say that if there is any desire among the farmers of your town to establish such a club, and to have the aid of any suggestions that might be offered by an agent employed by the State Board of Agriculture, it would be proper for them to hold a preliminary meeting and decide upon some definite time and place when and where they would like to have such an agent meet them to talk over the subject of farming. If such a desire exists, and it is the wish to have such an agent, will you please inform me of it at an early day, stating the time fixed upon, which should be sufficiently long after the date of your letter to give time for the necessary preliminary arrangements.

In cases where a farmers' club is already established, and is in operation at the present time, and desires to avail itself of the aid offered by the State, a copy of the constitution or form of organization, the number of members, the general course pursued, whether it be by discussions,

lectures, town shows, or otherwise, the nature of the assistance which would be most acceptable to the members of the club, and all other necessary information, should be forwarded to me, when, if it is practicable, the club may be furnished with copies of the Reports of the Board, and with one or more agents to take part in the discussions or lecture according to circumstances.

Please state explicitly, therefore, if it is proposed to ask any aid, what is wanted, and on what special subject it is desirable the agent should speak, the time when the meetings will be held, &c.

Any club which may be formed, or any club now in existence which may wish to avail itself of the provisions of the above named Act, will be expected to conform to said Act by making the required returns at the time specified, and to aid the Board in collecting facts and statistics relating to agriculture if it should hereafter be desired.

Very truly, your obedient servant,

CHARLES L. FLINT,
Secretary of the State Board of Agriculture.

At the annual meeting, held in January, 1860, it was—

Resolved, That in the opinion of this Board it is not expedient to incorporate any more agricultural societies receiving the bounty of the State.

At the same meeting it was—

Resolved, As the opinion of this Board, that a system of agricultural education should be adopted and form a part of the educational system of the State.

Voted, That a committee of three be selected to prepare a plan for carrying the above resolution into effect, and to report the same to this Board for further action.

The committee consisted of Messrs. Fay, Wilder and Brown.

At the meeting of the Board on the 1st of February, Mr. Fay, as chairman of the committee, presented the following

REPORT.

The Committee to whom was referred the consideration of a plan for agricultural education, to be connected with, and to form a part of, the general educational system of the State, beg leave to report:—

That they have given to the subject the attention which its paramount importance to the interests of agriculture justly

deserves. The emphatic and unanimous opinion, however, expressed by the Board as to the necessity of some systematic course of agricultural instruction being adopted in this Commonwealth, renders it unnecessary for the committee to enlarge upon the importance of education to those who are to be employed in cultivating the soil. Their duty appears to be principally confined to the suggestion of some plan by which this object can be best accomplished. A few preliminary remarks, however, upon the advantages to be derived by extending the benefits of education specially adapted to those who are to become farmers, based upon the idea of its being a proper object for the State to aid and direct, may not be out of place.

Agricultural improvement has ever been an object of much attention to all governments, for the obvious reason that the industry which supplies sustenance to the human race lies at the foundation of the political integrity and strength, as well as of the happiness and prosperity of a nation. From the purest despotism to the completest democracy, the same solicitude has always existed, for upon the cultivation of the land depends the chief resources of all governments. It measures by its excellence, and by the skill and intelligence displayed by the husbandman, the civilization, the refinement and the virtue of a people.

In this country the science of agriculture has been neglected for very obvious reasons. Possessing a wide extent of rich and virgin soil, which demanded no skill to make it produce abundantly, when one portion of the land became exhausted, new fields were occupied, and the old ones were neglected, until vast districts have been scourged of their natural fertility, and reduced almost to the condition of barrenness, to that degree, at least, which renders them unprofitable to cultivate, without more skill and more capital. This skill we have not acquired, because it has not been needed; it is now required, and without it labor is no longer rewarded in an equal degree in agriculture, as in other industrial pursuits. Hence it is, that we see efforts making in all directions to restore the soil to its former condition by the aid of science.

While this process of depreciation has been going on, we have been advancing rapidly in all other branches of human

industry. Every year, as it passes, finds us with an increasing number to be fed, who are not producers of food. The time has arrived, when it can be made profitable from the ready markets which are afforded from our numerous and increasing manufactories, and from a growing commerce, for farmers to apply themselves diligently to increasing the production of food, and to call in the aid of science and educated skill to assist his labors. Other arts have been developed than those of the husbandman, outstripping in their career, those which are exercised in agriculture. The incentives to improvement in this, the highest art, are not wanting, and it is for those who have charge of the public weal to give a right direction to the efforts now making to bring the practice of agriculture, by the aid of education, into harmony, and upon an equality, with other kinds of industry.

The foundation for the intelligent pursuit of every business is laid in our common school system. So far as it goes, it answers every purpose, and if any complaint could be made, it would be, perhaps, that it aimed at too much—that some things are taught that might better be omitted. One fact, however, is certain, that nothing is taught in our public schools which has any special bearing upon the future education of that large class whose lives are devoted to the cultivation of the soil, and stranger still, this class is the only one that cannot get the special instruction necessary for it anywhere else. There are private schools, academies and colleges for the education of youth for all other callings in life, but none for the farmer, who requires more than any other class a special training for his profession. The fact that the greater proportion of all labor is farm labor, seems to have been overlooked in the studies prescribed in the common schools. The simple teachings which appeal to the daily senses and to natural objects, have been too much neglected. The committee, without desiring to go into a minute criticism upon the instruction which is afforded, claim for agriculture a place in the system of public education; they assert for that interest the right to have introduced a few elementary studies which might profitably occupy a portion of the time of every child, whatever his future occupation might be, but which are of inestimable benefit to those who are to become farmers. These studies

cannot be commenced too early, for they are the germs of all future development, the vitality of which is never lost, but they must be planted early, if it is hoped to reach a full harvest.

If a person, who had the ability to perform whatever he undertook, should offer to the people of this Commonwealth a secret, by which in twenty years the productive value of the lands throughout the whole State would be doubled without any more outlay than is now required, what would that secret be worth? The diffusion of general agricultural education, such as the committee propose, would, in their opinion, accomplish this object, nay, go far beyond it, in less time than has been named, and at an expense so trifling as to be hardly worth mentioning in view of the benefits which would flow from it. There is no other way to effect this so easily, so cheaply, and so advantageously to the moral as well as material wealth of the State, as by commencing this education at an early period in the future farmer's life in our public schools.

Constant complaint is made that the pursuit of a farmer is unpopular with the young. That it is all hard work with no corresponding reward. That a farmer does not rank as high in the estimation of the community as other classes and professions. There is much truth in all this, and there are good reasons for it. Let us compare the education of a farmer with that of other professions. The boy who is to become a farmer leaves school at 16 or 17, and commences work upon the farm,—mere work, without one idea ever given to him as to the nature of the soil out of which he is to obtain his livelihood, without a thought as to the various processes connected with the beautiful laws of vegetation, without the slightest idea of races and breeds of cattle, and with not one general principle to guide him and to make intelligent the labor he is performing. Now this cannot be said of any other profession or industrial pursuit, although this one, more than any other, demands all the previous preparation which it is possible to give, by instilling into the mind, when young and perceptive, those general principles and teachings which lie at the foundation of all success, and of all that future knowledge which future practice and observation would, with a proper previous training, be sure to give.

Thus it is that labor to the boy who is to become the future farmer is irksome at the best, but in most cases it is worse than this, it is deadening to the mental faculties, at the time when they are most capable of being quickened and improved.

Compare this with other pursuits, from the youth who is intended for one of the learned professions, and whose preparation continues for years after the age at which the boy is *condemned* to the farm, to the lad who goes to the counting-room or the factory, where the work is comparatively light, and where the mind is amused and intellect is excited. Is it any wonder that farming is unpopular under these circumstances, or is it surprising that farmers with such an education for their pursuit, should not hold their proper place in public estimation? How completely would this be changed were boys educated for this pursuit, and brought up to the standard of skill and intelligence that is necessary in order to enter successfully upon any other industrial career? It is education which gives dignity to the man, be his profession what it may; and there is no calling in Massachusetts which would rank higher than that of the farmer, if those who entered upon it were sufficiently educated to make it successful and profitable.

The committee reluctantly leave all farther general consideration upon the importance of early and systematic agricultural education. They would gladly point out the bearing which its introduction would have upon the moral and social condition of all classes of society through the influence and example of a highly prosperous and well-educated agricultural class,—they would like to show what would be the effect of greater agricultural skill and intelligence upon our political institutions, and to enlarge upon the benefits which would ensue to the State by elevating the agricultural interest, and bringing it to a level with the same occupation in other countries. All this, however, would require more time than can well be given to the purpose. They will therefore proceed at once to a consideration of the plan which they propose for accomplishing this object.

In doing so, however, they would premise by saying that what they intend to recommend they do not consider as all that may be or ought to be done hereafter. What they are going to propose is only a commencement of a system of agricultural education, to be elaborated and enlarged in such manner as experi-

ence may suggest. They are unwilling to hazard any thing by proposing a plan for adoption which might fail from its being too complex in its character, or too expensive in the outset to find acceptance. They propose, therefore, as the first step in furnishing agricultural education,

1st. The ingrafting upon our common school education the study of the elementary principles of geology, of agricultural chemistry, of physiology, and of botany.

They propose that these shall be taught by manuals, in the usual form of question and answer, and that they shall be confined to the plainest leading principles applicable to the cultivation of the soil, and prepared in such a manner that it will not depend altogether upon the knowledge of the instructor to make them of use to the learner.

It is only necessary to appeal to the individual experience of every one for a just estimate of the importance of this simple and inexpensive measure. Our children would, from this slight addition to their usual studies, learn something which would every day be more and more deeply implanted in their minds by their daily walks to the school-room. They could not see a tree send forth its leaves, its flowers, its fruits, or the fresh sod turned over by the plough, or the rain fall from the heavens, or the sun shine upon the earth, without attaching to these now unheeded operations a meaning and a significance, and without inspiring in their minds a spirit of investigation and inquiry, which would be preparing them for the practical pursuits of after life.

The vital principle in the plan proposed is to start the education of the future farmer at the earliest possible period, and to do this, the commencement must be in our public schools, while the other parts of a boy's education are going on. But it must not stop here. It has already been remarked, that special schools, academies and colleges, exist for the instruction of youths intended for every other career in life except that of a farmer. They leave the public schools, where they have been well prepared to enter upon the special education for the profession for which they are designed, while the boy who is to become a farmer is left to shift for himself. He is dropped upon the farm, as it were, wholly unfitted, wholly unprepared, to reap any advantage from what he has already been taught. His education stops short, just at the moment when a very moderate

degree of special instruction would fit him to enter life with every prospect of success. To supply this absolute want, the committee propose the establishment of—

2. An agricultural school, with a farm attached to it, in each county, to be devoted exclusively to agricultural instruction, uniting science with correct practice.

The committee do not consider that the adoption of the second feature of their plan as of so much immediate necessity as the first, or that the adoption of the first is to depend at all upon the second being immediately entered upon. But it follows naturally, if not necessarily, in any prescribed course of agricultural education.

The establishment of county agricultural schools requires a great deal of consideration as to detail, with which it is not considered necessary to incumber a report of this nature, and the committee will therefore confine themselves to a few general remarks as to what is proposed to be accomplished by these schools of special instruction, without attempting to present a well-digested plan for their organization.

They will content themselves with remarking, that these county schools need not be expensive undertakings. They should be commenced upon the plan of educating youths in the best methods of farm management, connecting with it such knowledge of the science and theory of agriculture, as can be obtained by devoting a portion of the time to study, under competent instructors. At these schools, system, economy, the right adaptation of means to ends, the knowledge of what can be cultivated with profit, by learning to calculate the cost of production,—in short, the doing of every thing, with the reason for doing it, to be shown by a satisfactory result,—these are the main points to be observed in establishing them. There are in the numerous schools already established in various parts of the world, means for digesting a plan suitable for Massachusetts. The report of Dr. Hitchcock on the agricultural schools of Europe, and the essay of the Hon. H. F. French, now in course of publication by the Massachusetts Society for Promoting Agriculture, furnish full information upon this subject.

In recommending so simple a plan, and one so unpretending in character, the committee fear that it may disappoint the

expectations of many who desire the establishment of a large and expensive institution, similar to those which have been commenced in other States. To such they can only say that they are as desirous as any one can be, to see the science and practice of agriculture carried as far as the most enthusiastic could wish. But they desire to aim at the possible,—to begin education at the right point,—to set in operation primary instruction,—to lay the ground work, and when carried forward to the establishment of county schools, to leave it there to work itself out, if it be required, into higher forms than it would be proper for the State to undertake to mould or to direct.

The committee are aware that this subject has occupied the attentive consideration of leading minds in the State. All agree in the importance of a higher agricultural education, but there is much difference of opinion as to how it should be accomplished. They are of opinion that why nothing more has as yet been attempted, arises from too much having been aimed at. Most of the plans proposed begin at the wrong end. What advantage are colleges, where there are no schools? How small the benefits of lectures and of essays to the wholly uninformed! This seems to be the opinion of our distinguished Secretary of the Board of Education, Mr. Boutwell, who says: "We build from the primary school to the college, and without the primary school and its dependents, the grammar, high school and academy, the colleges would cease to exist." This is perfectly true, and was well applied by him with respect to the expediency of establishing an agricultural college.

The formation of farmers' clubs is recommended,—the delivery of public lectures,—the circulation of tracts broadcast over the State as a mode of agricultural education. All these are no doubt of service to those who are farmers, and who have time to devote to educating themselves, while attending to their business. But the same objection applies to these methods of instruction as to a college. Without an elementary agricultural education, without a certain degree of the knowledge of correct practice in agriculture, little comparatively is learned from farmers' clubs, from lectures, or from tracts. One must know how, at least, to distinguish the true from the false, to have some few well grounded principles in his mind, or he will be quite as likely to be injured as benefited by what he hears

from the desk, or from debate, or from tracts. It is this knowledge which the primary school and county schools are intended to give in the plan proposed. Then these adjuncts to a farmer's education, for they can be nothing more, are useful. As education now is, experience being our principal teacher, the last half of a farmer's life is employed, provided he is a diligent student, in unlearning what the other half was spent in learning. If, however, he had commenced his career with a few well-grounded principles, he would in that time have built up a solid, practical education. Farmers' clubs, lectures and tracts, are of great service to a well-educated farmer, because "the more a man knows, the more he may know," and the earlier the period at which we commence laying in our stock of knowledge, the wider and more useful it will be. Knowledge is self-cumulative, provided it is sound at the core.

In conclusion, the committee would most earnestly urge upon the Board and the friends of agricultural education generally, not to suffer the present session of the legislature to pass away without attempting, through a legislative enactment, should any be found necessary, to ingraft the first measure in the plan submitted upon our present school system. It appeals so strongly to the good sense and to the sound patriotism of every citizen, whatever his profession may be, it is impossible to believe that the measure, if recommended by the Board, can fail of being adopted.

Richard S. Fay,
Marshall P. Wilder,
Simon Brown,
Committee.

The above report having been accepted and adopted, it was

Resolved, That the Committee on Agricultural Education be and are hereby authorized to obtain an elementary manual of agriculture for the use of our common schools, to be submitted to this Board for approval.

Resolved, That the said committee be requested to cause to be introduced the aforesaid manual, when approved by this Board, into the common schools of Massachusetts, in the manner provided for the introduction of school books by the laws of the Commonwealth, and that said committee be authorized to apply to the legislature for the passage of an Act for the accomplishment of this object.

The committee on this subject was thereupon increased to five by the addition of Messrs. Loring and Fisher.

THE AGRICULTURAL MUSEUM.

Constant efforts have been made to build up the State Cabinet, the object being to make a collection illustrating all branches of the natural history and the agriculture of the Commonwealth, and many valuable additions have been made to it during the past year, the aggregate number of specimens exceeding three thousand.

It is gratifying to be able to state that the interest in the cabinet has largely increased as its practical value has become more and more manifest. A catalogue of the plants will be found in the Appendix. In other departments the additions, though not so extensive, are nevertheless valuable and interesting.

Mammalogy.—In this department of Natural History, acknowledgments are due many individuals for donations of rare and valuable specimens. The field is not large in this department, in this State, but there are some species which are particularly interesting, both to the farmer and naturalist, but which have not generally received the attention they deserve; for instance, those little animals, the mice, shrews and moles, are greatly deserving the attention of the agriculturist with reference to the amount of injury or benefit they may do him. The mice are generally injurious to the farmer; being vegetable feeders, they do great mischief by feeding upon the roots of vegetables, and in hay ricks by cutting up the dried hay into mere fragments, and rendering it entirely unfit for the use of cattle. But the farmer should not confound the mice with the shrews, for the latter are generally beneficial to him, being insectivorous, or feeding principally on worms and insects. The moles are also beneficial to the farmer; they render him considerable service by loosening the soil, and by destroying insects which injure the roots and herbage of plants. It is to be hoped that a complete collection of these different animals, existing in the State, may be placed in the State Cabinet, that the farmer may know which animals are his friends and which his enemies.

Joseph L. Pratt, of Reading, presented a fine specimen of the Canadian Lynx (*Lynx canadensis.*) This animal (though the present specimen was killed on Mount Hayes, in New Hampshire,) is included in the mammalia of this State. In the "Report on the Quadrupeds of Massachusetts, published agreeably to an order of the legislature, in 1840, by Ebenezer Emmons, M. D.," we find that "it was once common in this State, but appears now only in the depth of winter, and

as a straggler. One was captured a few years since in the neighborhood of Chester village, in Hampden County. Nature has supplied it with clothing remarkably well adapted to a cold climate. It is strictly a northern animal, and is found as far north as 66°." The present specimen is a female: it was captured late in the fall of 1859, and was evidently a full grown and perfect specimen. It is a valuable addition to the cabinet.

W. H. Floyd, of Weston, presented a fine specimen of the Ermine (*Putorius noveboracensis.*) This specimen is in a somewhat remarkable dress. The winter dress of the ermine is a pure white, but the present specimen is about two-thirds pale yellow.

Mr. Floyd has also presented the following specimens: A male and female of the Least Weasel (*Putorius pusillus*); (the male is in the summer dress and the female in the winter dress;) and a specimen of the Skunk (*Mephitis americana*).

Maj. James S. Grennell, of Greenfield, has presented a specimen of an albino Woodchuck (*Actomys monax*). This albino is very rare.

Maj. Grennell also presented an albino Red Squirrel (*Sciurus hudsonius*). This is also a very rare albino, and the donation of these specimens may be justly called valuable.

Mr. E. S. Wheeler, of Berlin, has presented the following specimens: A fine specimen of Ermine (*Putorius noveboracensis*), winter dress, and three specimens of the Flying Squirrel (*Pteromys volucella*).

Mr. Wheeler has sent us many other specimens, some of them duplicates, and some too long killed to be mounted. His interest in the cabinet has been a means of the acquisition of some of its most valuable specimens in every department, and we take this opportunity to return thanks.

Other individuals have sent specimens, but sufficient care was not taken in the forwarding of them to the cabinet in season to have them prepared.

Ornithology.—Many additions have been made to this department during the past year, and acknowledgments are due for donations of some rare and valuable specimens.

W. H. W. Perry, of Framingham, presented twenty-seven skins of Massachusetts birds. His donation consists of:—

Two specimens of the Red-shouldered Hawk (*Buteus lineatus*), male and female.

A specimen of the Black-billed Cuckoo (*Coccygus erythrophthalmus*).

A specimen of the King Bird (*Tyrrannus carolinensis*), male.

A specimen of Pewee (*Sayonis fuscus*).

A specimen of the Wood Pewee (*Contopus virens*), female.

A specimen of Least Flycatcher (*Empidonax minimus*), female.

A specimen of Wood Thrush (*Turdus mustelinus*,) male.

A specimen of Hermit Thrush (*Turdus palasii*), male.

Two specimens, male and female, of the Wilson's Thrush (*Turdus fuscescens*).

A specimen of the Black and White Creeper (*Mniotilta varia*), female.

A specimen of Yellow Rump (*Dendroica coronata*), female.

A Chestnut-sided Warbler (*Dendroica pennsylvanica*), male.

A specimen of the Black-poll Warbler (*Dendroica striata*), female.

A specimen of the Black and Yellow Warbler (*Dendroica maculosa*), male. This is quite a rare species, and new to the cabinet. It is a valuable acquisition.

A specimen of the Canada Flycatcher (*Myiodioctes canadensis*), female.

A specimen of the Scarlet Tanager (*Pyranga rubra*), female.

A specimen of the Cedar Bird (*Ampelis cedrorum*), female.

A specimen of the Cat Bird (*Mimus carolinensis*), female.

A specimen of the Red Crossbill (*Curvirostra americana*), male.

Two specimens of the Rose-breasted Grosbeak (*Guiraca ludoviciana*), male and female.

A specimen of the Indigo Bird (*Cyanospiza cyanea*), female.

A specimen of the Bobolink (*Dolichonyx oryzivorus*), male.

A specimen of the Crow Blackbird (*Quiscalus versicolor*), male.

A specimen of the Common Crow (*Corvus americanus*).

Acknowledgments are also due James S. Grennell, of Greenfield, for the following donation:—

Three specimens of the Gos Hawk (*Astur atricapillus*), one male and two females.

A specimen of the White-headed Eagle (*Haliœtus leucocephalus*), young male.

A specimen of the South Southerly (*Harelda glacialis*), young male.

Charles W. Keniston, of Upton, presented a fine specimen of the Golden Eagle (*Aquila canadensis*), young female. This is a rare bird everywhere, and is very seldom found in this State. The present specimen is in very nearly the adult plumage, and is a fine and valuable specimen and an acquisition to the cabinet.

J. P. Haskell presented a specimen of the Sky Lark (*Eremophila cornuta*), female.

A specimen of the Semipalmated Plover (*Aegialitis semipalmatus*).

A specimen of the Ruddy Duck (*Erismatura rubida*), young male.

Charles L. Flint presented a specimen of the Sparrow Hawk (*Falco sparverius*), male.

A specimen of the Shoveller (*Spatula clypeata*), male.

A specimen of the Velvet Duck (*Melanetta velvetina*), male.

E. A. Samuels presented a specimen of the Sparrow Hawk (*Falco sparverius*), female.

A specimen of the Blue Jay (*Cyanura cristata*), female.

A specimen of an albino Barn Swallow (*Hirundo horreorum*), female.

A specimen of the Purple Finch (*Carpodacus purpurea*), male.

A specimen of the Fox-colored Sparrow (*Passerella iliaca*), male.

A specimen of the Ground Robin (*Pipilo erythrophthalmus*), male.

A specimen of Swamp Blackbird (*Agelaius phoeniceus*), male.

A specimen of Rusty Blackbird (*Scolecophagus ferrugineus*), young male.

A specimen of the Green Heron (*Butorides virescens*), female.

A specimen of the Night Heron (*Nyctiardea gardeni*), female.

J. P. Haskell presented a specimen of the Guillemot (*Uria grylle*), female.

Dr. S. Cabot, Jr., of Boston, presented a specimen of the Hooded Merganser (*Lophodytes cucullatus*), male.

Charles W. Lovett, Jr., of Boston, presented a specimen of the Arctic Skua (*Stercorarius parasiticus*), female.

Also a fine specimen of the Scoter Duck (*Oidemia americana*), female.

H. B. Upham presented a specimen of the Gos Hawk (*Astur atricapillus*), male.

James Hall presented a specimen of the Marsh Hawk (*Circus hudsonius*), male.

David Parham presented a specimen of the White-headed Eagle (*Haliaetus leucocephalus*), young female.

James M. Hastings presented a specimen of the Osprey (*Pandion carolinensis*), male.

Augustus Bunce presented a specimen of the Mottled Owl (*Scops asio*), female.

Charles H. Hartley presented a specimen of an albino Robin (*Turdus migratorius*), male.

E. S. Wheeler presented a specimen of the Blue Bird (*Sialia sialis*), male.

A specimen of the Red Crossbill (*Curvirostra americana*), male.

—— Merrill presented a specimen of the Snow Bunting (*Plectrophanes nivalis*), female.

One specimen of Indigo Bird (*Cyanospiza cyanea*), male.

A specimen of the Rusty Blackbird (*Scolecophagus ferrugineus*), young male.

One specimen of the Little Auk (*Mergulus alle*).

David and Daniel Parham presented a specimen of the Raven (*Corvus carnivorus*), killed in Tyngsborough. This is a very rare bird in this State, and is rare east of the Mississippi River.

Elijah C. Howard presented a specimen of the Great Blue Heron (*Ardea herodias*), female.

E. S. Rand, Jr., presented a specimen of the Least Bittern (*Ardetta exilis*). Rare in this State.

A specimen of the Night Heron (*Nyctiardea gardeni*), male, complete plumage.

Nathan Robbins presented a specimen of the Bittern (*Botaurus lentiginosus*).

H. E. Cox presented a specimen of an albino Woodcock (*Philohela minor*).

Capt. E. W. Gardner presented a specimen of the Coot (*Fulica americana*).

W. Mason presented a specimen of the common Gannet (*Sula bassana*), young female.

John Brooks presented a fine specimen of the Great Northern Diver (*Colymbus glacialis*), male, in complete plumage.

Mrs. P. B. Clark presented a specimen of the Little Auk (*Mergulus alle*).

There have been a great many other specimens donated to this department, but in a great many cases the birds were kept too long before they were forwarded. In other cases there were many duplicates sent, for instance, as many as twenty specimens of the Gos Hawk (*Astur atricapillus*) were received. But a very few of them were desirable as cabinet specimens, merely the adult and immature plumages.

Oology.—During the past year the foundation has been laid for a collection in this department of Natural History in the State cabinet, principally the donation of W. H. Floyd, of Weston. This department should be as complete as possible, embracing eggs and nests of all Massachusetts birds. Though not so useful perhaps as the other branches to the farmer, no collection of Natural History could justly be considered complete without this department being fully represented; it is to be hoped, therefore, that during the coming year our farmers and students of Natural History will build up this department and make it like the other branches, creditable to the State.

Mr. Floyd's donation consists of—

Duplicate nests and eggs of the Yellow-billed Cuckoo (*Coccygus americanus*).

Duplicate eggs of the Yellow-winged Woodpecker (*Colaptes auratus*).

Duplicate nests and eggs of the Chimney Swallow (*Chaetura pelasgia*).

Duplicate eggs and nest of the King Bird (*Tyrannus carolinensis*).

Duplicate eggs and nest of the Pewee (*Sayornis fuscus*).

Nest of the Wood Pewee (*Contopus virens*).

Duplicate eggs and nest of the Wilson's Thrush (*Turdus fuscescens*).

Duplicate eggs and nest of the Robin (*Turdus migratorius*).

Duplicate eggs of the Blue Bird (*Sialia sialis*).

Duplicate eggs and nest of the Golden-crowned Thrush (*Seiurus aurocapillus*).

Nest of the Chestnut-sided Warbler (*Dendroica pennsylvanica*).

Duplicate nests and eggs of the Scarlet Tanager (*Pyranga rubra*).

Nest and eggs of the Cedar Bird (*Ampelis cedrorum*).

Duplicate nests and eggs of the Red-eyed Flycatcher (*Vireo olivaceus*).

Duplicate nests of the White-eyed Flycatcher (*Vireo noveboracensis*).

Duplicate eggs and nest of the Cat Bird (*Mimus carolinensis*).

Duplicate eggs and nest of the Brown Thrush (*Harporhynchus rufus*).

Duplicate eggs and nest of the Black-capped Titmouse (*Parus atricapillus*).

Duplicate nests and eggs of the Yellow Bird (*Chrysomitris tristis*).

Duplicate eggs and nest of the Grass Finch (*Pooecetes gramineus*).

Duplicate eggs and nest of the Chipping Sparrow (*Spizella socialis*).

Duplicate nests and eggs of the Ground Robin (*Pipilo erythrophthalmus*).

Duplicate eggs and nest of the Swamp Blackbird (*Agelaius phœniceus*).

Duplicate eggs of the Cow Bird (*Molothrus pecoris*).

Duplicate eggs and nest of the Meadow Lark (*Sturnella magna*).

Nest of the Baltimore Oriole (*Icterus baltimore*).

Duplicate eggs and nest of the Blue Jay (*Cyanura cristata*).

Duplicate eggs of the Ruffed Grouse (*Bonasa umbellus*).

Duplicate eggs of the Spotted Sandpiper (*Tringoides macularius*).

Acknowledgments are also due E. W. B. Canning, for donation of an egg of the Great Northern Diver (*Colymbus glacialis*). In the "Report on the Ornithology of Massachusetts," by William B. O. Peabody, we find that this bird breeds in the fur countries and the British Provinces, in the most retired places which it can find, in rocky islets, or the borders of lakes, but that the present specimen was found in this State establishes the fact that it occasionally breeds here.

E. S. Rand, Jr., of Dedham, presented duplicate eggs of the Night Heron (*Nycticorax gardeni*).

E. A. Samuels presented the nest and egg of the Chestnut-sided Warbler (*Dendroica pennsylvanica*). The nest of this bird is seldom found, and the egg is quite rare, never having been found, we believe, by those great naturalists, Audubon and Wilson. Mr. James Eliot Cabot

found a nest in Brookline, Mass., a few years since. These seem to be the only cases on record.

E. S. Wheeler, of Berlin, presented a nest of the Ruby-throat Humming Bird (*Trochilus colubris*).

F. R. Stebbens presented another nest of the Humming Bird.

We would make a few suggestions on the preparation of specimens previous to forwarding.

Animals should be sent as soon as possible after being killed. A great many specimens, and some of them rare, arrived in a state in which it was not practicable to mount them.

The only preparation necessary, if the specimen is a large one, is to plug the shot-holes with cotton and sprinkle a little powdered plaster of Paris on the blood which may have escaped. If this plaster is not convenie n of access, wood ashes will answer the purpose. Also plug the nostrils and throat with cotton. In extreme cases the entrails may be removed, and a little salt sprinkled in the animal. Small specimens may be forwarded with only the precaution of stuffing the nostrils and throat with cotton.

Birds should be forwarded as soon as possible after being killed. The only preparation they require is the stuffing the throat with cotton.

Eggs and nests require a little care in packing. If possible, the contents of the eggs should be removed by making a puncture in each end of the egg, and then putting one end to the mouth and gently blowing, forcing the contents through the aperture of the other end. The shells may be then packed in cotton and placed in the nest. The whole may be then packed in a box strong enough to protect them,—in every case with the bird, if there is the least doubt as to the identity of the egg.

Ichthyology.—A few specimens only have been added to this department during the past year, the donation of Capt. N. E. Atwood being the greater portion. It consists of—

A fine specimen of the Bass (*Labrax lineatus*).

Two specimens of the Brazen Bull Head (*Cottus virginianus*).

A specimen of the Grunter (*Prionotis lineatus*).

A specimen of the Spring Mackerel (*Scomber vernalis*).

A specimen of the Rudder Fish (*Palinurus perciformis*).

A specimen of the Blue Fish (*Temnodon saltator*).

A specimen of the Silver Side (*Atherina notata*).

A specimen of the Tautog (*Tautoga americana*).

Two specimens of the Creek Trout (*Salmo erythrogaster*).

A specimen of the Shad (*Alosa sapidissima*).

Two specimens of the Alewive (*Alosa tyrrannus*).
A specimen of the Menhaden (*Alosa menhaden*).
A specimen of the Haddock (*Morrhua æglefinis*).
A specimen of the Poor Cod (*Morrhua minuta*).
A specimen of the Cusk (*Brosmius flavescens*).
A specimen of the American Hake (*Merlucius albidus*).
A specimen of the Flounder (*Platessa plana*).
A specimen of the Spotted Turbot (*Pleuronectes argus*).
Three specimens of the Peck's Pipe Fish (*Syngnathus Peckianus*).
Two specimens of the Mud Lamprey (*Ammocœtes bicolor*).

There were but few other specimens added to this department during the past year, and as these are not yet placed in jars and arranged, the donors' names attached to them, &c., acknowledgments will be made hereafter.

Herpetology.—Not much has been done for this department during the past year. The field is not large in this State, Perhaps this may account for the apparent meagreness of the additions.

Acknowledgments are due W. H. Floyd, who presented—
A specimen of the Wood Tortoise (*Emys insculpta*).
An undetermined species of Tortoise.
A specimen of the Striped Snake (*Coluber sirtalis*).
A specimen of the Black Snake (*Coluber constrictor*).
An adult specimen of the Water Adder (*Coluber sipedon*), and 57 young.
A specimen of the Bull Frog (*Rana pipiens*), and tadpole of the same.
A specimen of the Wood Frog (*Rana sylvatica*).
A specimen of the common Tree-Toad (*Hyla versicolor*).
Three specimens of the Many-spotted Salamander (*Salamandra millepunctata*).
Two specimens of the Symmetrical Salamander (*Salamandra symmetrica*), and several other specimens not yet prepared.

E. A. Samuels presented two specimens of the Banded Salamander (*Salamandra fasciata*). This specimen is very rare, and was found under a stone in a damp locality.

Two specimens of the Spotted Tortoise (*Emys guttata*), and a number of other specimens not yet prepared.

L. H. Samuels presented a fine specimen of the Rattlesnake (*Crotalus durissus*). This specimen was killed in Milton, has ten rattles, and is forty-nine inches in length.

F. G. Sanborn presented a specimen of the Painted Tortoise (*Emys picta*).
Two specimens of the (*Salamandra venenosa*).

Two specimens of the Symmetrical Salamander (*Salamandra symmetrica*), and several other specimens not yet arranged.

J. Heard and J. O. Treat presented two specimens of the Chicken Snake (*Coluber eximius*).

Some few other specimens have been presented, but they are not yet arranged. Acknowledgments will be made hereafter.

Entomology.—This department has been materially increased during the season by the addition of some four or five hundred species, and over two thousand specimens new to the cabinet, most of which were collected by persons engaged on the new edition of Harris' Treatise on Insects. Besides these, we have to thank Mr. E. S. Wheeler, of Berlin, for three boxes of insects from that vicinity, many of which are quite rare and valuable. The attention of contributors is called to the fact of its being impossible to handle or preserve a specimen entire, *unless the pin on which it is impaled projects at least half its length below the body of the insect.* Valuable specimens have from time to time been presented by Mr. Dennis Murray, of Roxbury; among them a very fine male of *Dryocampa imperialis* from that locality. Some specimens of Orthoptera, one quite rare, a Hetrodes, and larvæ of Ægeria, were donated by Dr. Morse, of Clinton.

Exchanges have been made with various individuals for species new to the cabinet, and some few donations have been received from other sources of single specimens, all of which, though acceptable, we have not room to mention here.

Miscellaneous.—Specimens of iron ores from quarries in West Stockbridge, North Adams, Sheffield, Richmond and Cheshire, have been received from E. R. Tinker, Esq., of North Adams, together with fine specimens of serpentine, from Florida, and white marble from Egremont and North Adams.

From Marcus Barrett, Esq., of Auburn, specimens of green stone with pyrites.

A block of consolidated Berkshire sand, from Mr. Burt, of Cheshire.

Iron ore from West Stockbridge, from Amos Smith, Esq.

From F. W. Mason, Esq., Dartmouth, fossil amber, found on the sound side of Nashawannock Island, supposed to have drifted from Gay Head.

Also specimens of fossil fish from the Connecticut River, from James T. Gunn, Esq.

Specimens of conglomerate from Anawan Rock, John C. Marvel, Rehoboth.

Dr. JOHN C. BARTLETT, of Chelmsford, donated a very ancient pair of hames, of rude workmanship.

Mr. WILLIAM M. TAYLOR presented a patent Tree-protector, intended to prevent the attacks of the canker worm and similar insects.

And a model of Cahoon's patent Broadcast Seed Sower was also received from the inventor.

The AQUARIUM.—The Hon. JOHN BROOKS, of Princeton, has presented to the office an elegant aquarium, of a capacity of one hundred and ninety-two gallons, so arranged as to exhibit both fresh and salt water specimens, or moving "life beneath the waters."

Captain THOMAS GLASS, of Swampscott, presented several of the most beautiful actiniæ ever seen in Boston. These were brought up from the bottom in thirty or forty fathoms of water, and for several weeks formed the most attractive feature in the tank.

Acknowledgments are also due to Messrs. WARREN ATKINS, JOHN P. THOMAS, JAMES BUNTEN, WILLIAM STORY, GEORGE THOMAS, CHANDLER LEWIS, JOHN THOMAS, and others, of Swampscott, for fine specimens of spider crabs, star fishes, actiniæ, &c.

Similar contributions of rare and valuable specimens in all the departments, illustrating the natural history of the State, are earnestly solicited.

I am happy to be able to state, in conclusion, that the farming interest of the Commonwealth has, on the whole, experienced, during the past year, an ordinary degree of prosperity, notwithstanding the fact that for some of the staple crops, the season was by no means propitious. Enterprise and capital applied to farming have, in some localities, largely increased, and it is apparent that greater attention is hereafter to be paid to farm industry of various kinds, to sheep husbandry, and to the improvement of other stock.

There is, however, with our abundant reasons of congratulation, one subject of deep regret and alarm which is of too serious a character to be passed over without special mention. I refer to the introduction and appearance in our midst of a contagious or infectious disease among neat stock, which, from its well-known symptoms, can leave little room for doubt, is the genuine *pleuro-pneumonia*, one of the greatest scourges which could possibly fall upon the farming community. The extent of this calamity, if the disease is allowed to spread and gain a firm foothold in this country, can hardly be imagined

or described. It is so insidious in its approach, that it may remain in the herd for some time before it is discovered, and then it will probably be too late to effect a cure. Indeed after it has passed its first stage and become seated upon the animal, it is either wholly incurable, or if an apparent cure is effected, it will turn out, in the end, that the first loss would have been the best, and that all infected animals ought to have been at once destroyed.

This dangerous disease derives its name from the parts affected, the *pleura* being the lining membrane of the lungs, and *pneumonia* the substance of the lung itself. The lungs are found, on a *post mortem* examination, to have lost their light, porous consistence, and their pinkish color, and to have become condensed or filled with lymph, dark or nearly black, impervious to air, and of course incapable of expansion and contraction, and of oxygenating or vitalizing the blood.

The first symptom that will be likely to attract attention will be a dry, husky cough, which is more and more perceptible after the animal has been watered or moved, or in any way excited. After a time the appetite falls off, rumination ceases, the coat becomes staring, the temperature over different parts of the skin and the external surfaces is unequal, the horns may be hot and cold alternately, or one part of the body may be very warm and feverish at the same time that the other is cold ; the respiration is quickened and more labored, the pulse quickens, the flesh rapidly falls off, the nostrils begin to discharge a lightish substance, till finally the breathing grows shorter and gasping, the breath itself becomes fetid and insupportable, and the poor creature dies.

The contagion appears to be communicated by an animal poison in the air, proceeding from the lungs and breath or the respiratory surfaces of a diseased animal, and another animal coming in contact or within the influence of this vitiated air, is very liable to be infected. It attacks old animals and young, cows in milk, or otherwise, calves and oxen, indiscriminately, but does not extend to horses, or any but neat stock. Its outbreak in any herd can be traced directly to the introduction into it of cattle from some infected herd, and its spread and extension can only be prevented by the immediate and complete isolation of the infected animals from others, or the

destruction of all animals in which premonitory symptoms appear, and those which have been exposed to the infection.

As this is a great public evil, in which the whole community, both producers and consumers, is directly and in the highest degree interested, and as it would be the greatest national calamity which could fall upon the country if allowed to spread and extend beyond its present limits, it seems eminently proper that the legislature should take the most prompt and strenuous measures to stop it where it is, by ordering the immediate destruction of all infected herds.

CHARLES L. FLINT,

Secretary of the State Board of Agriculture.

Boston, January 25, 1860.

REPORTS OF DELEGATES

APPOINTED TO VISIT THE

AGRICULTURAL EXHIBITIONS.

ESSEX.

The cattle show of the Essex Agricultural Society was held in Danvers, on the 28th and 29th days of September last, and was attended by your delegate on the latter day, with more than ordinary interest and satisfaction. Returning to his native county, and to the home of his early manhood,—meeting again the friends endeared to him by many pleasant associations, he regarded your appointment as a privilege, and was rewarded in the fulfilment of it, with the highest gratifications.

Prevented by unavoidable engagements from being present on the first day of the exhibition, your delegate arrived the next morning in season to witness the chief performance of the occasion on the field,—the ploughing match. This was engaged in by twenty-four competitors, and afforded a most exciting spectacle to a large concourse of people. The grounds were of the best character and condition. They had been marked out with great precision,—a point not always attended to with sufficient care. The contestants were all ready on the instant, and started off at the given word, like men accustomed to the work. The teams were all in good working condition, and their proper training was noticeable. Double teams, consisting of one yoke of oxen and a horse, were required to plough one-sixth of an acre, nine inches deep, with the Michigan plough, and eight inches deep with any other. Single teams and horse teams were required to plough the same quantity of land six inches deep. These requirements were, as we judged, complied with, and the whole work was performed with the skill and ease which mark the labors of good ploughmen. We have rarely witnessed any thing of the kind so well executed. Amongst the competitors were some of a green old age, handling the plough and driving the team with the vigor and ease of early manhood, offering to the young an example fitted to fire their ambition, and well worthy of their imitation. No boisterous shouting was heard, and only in a few instances was any needless hurrying of the teams observed. The quiet, patient, thoughtful driver of a team may not always be a

successful competitor on the field, though, if other things be equal, he first deserves a premium, but he is apt to prove, in the long run, the most profitable workman in his department, to be employed on the farm.

We observed here the same conditions which are commonly attached to premiums for ploughing,—that the ploughmen and drivers shall have been residents in the county at least three months previous to the exhibition. We would add to this another condition,—that the competitors shall have been owners of the plough in use for a similar or some sufficient length of time. We are aware of the differences of opinion on this point, but have seen no reason to doubt that perfect fairness in the contest demands such a condition. We know that much dissatisfaction, and sometimes injurious consequences to the society have resulted from the opposite course.

From the ploughing match we passed to observe the well-filled pens, containing cattle, horses, sheep and swine of various breeds, and presenting, as a whole, an exhibition creditable to the society, but not equal to those of some former years. We were gratified to observe the encouragement afforded here to the raising of the best neat stock of native and grade, as well as foreign breeds,—believing as we do, that they are best suited to our pastures and our climate, and with equal care, will yield better returns in the products of the dairy, and in meat for the stalls. A good herd of twenty-five milch cows from one farm were arranged together in the same division of the pens. We were struck with their appearance, as affording a good indication of what many dairy farms in the county might probably have added to the exhibition. And we recommend the offering of herd premiums, which may have the effect to bring to the exhibition annually large collections of the best milch cows.

Much attention seems to be given here to the raising of the horse,—not, we presume, merely for the road or the turf, but for solid farm work. The former object is indeed worthy of encouragement, and falls within the legitimate purposes of agricultural societies. But the danger is, that the latter will be made to yield precedence to it, and that a reputation for speed will become the principal value of a horse. Such a

result does not appear to have been produced here, although there were but few draft horses on exhibition.

From the field we passed to the halls, in which were displayed products of the dairy, fruits, flowers, vegetables, household manufactures, works of art, &c. Of all these there was an abundance. The crowded state of the rooms allowed only a hurried view of so many different objects. Enough, however, was observed, to enable us to speak favorably of the whole. The collection of fruits, particularly of apples, was superior to any we have seen this year, and could not, we think, have been surpassed, if equalled, in any part of the State. Of butter, bread and cheese there were many fine looking specimens, but we had no opportunity to test their quality.

The public exercises in the Pleasant Street Church were of the most appropriate character. The address by J. J. H. Gregory, Esq., of Marblehead, was listened to by a numerous and appreciating audience, and will amply repay the perusal of it, as a production of great merit.

An abundant, well-prepared and well-served dinner was furnished to several hundred guests, in the vestry of the beautiful church recently erected by the Universalist Society. After this, an admirable speech on sheep husbandry and market fairs was delivered by Richard S. Fay, Esq., of Lynn, formerly president of the society. We hope to see this speech printed and extensively circulated throughout New England. Mr. Fay has devoted much thought to these subjects, the fruit of which, as presented by him here and elsewhere, in a winning manner and with convincing force, cannot fail to be acceptable and highly serviceable to the community. Speeches were also made by Hon. Mr. Gooch and Hon. Mr. Alley, members of congress, by Charles L. Flint, Esq., Secretary of the Board of Agriculture, by Hon. Mr. Esty, of Middlesex South, and Col. Stone, of Norfolk Society, and by several others, all of which were appropriate and well received.

The mingling, in this last sentence, of the names of so many individuals present on this occasion, from different counties, suggests the benefit which might be derived from a more general interchange of visits, on such occasions, by members of different societies. It leads us also to recommend a regular

appointment, in each society, of one or more delegates to attend the several exhibitions in the State, and to report thereon to their own associations. Much good, we conceive, would result from it.

We have only to say, further, that we are indebted to the Hon. President of the Society, Daniel Adams, Esq., the Vice-President, Lewis M. Allen, Esq., the Secretary, Hon. A. W. Dodge, and to several members of the society for the most gratifying attentions, and that we regret our inability to be present at an earlier day, and to make a more leisurely and thorough examination of what we believe to have been an exhibition worthy of a county so distinguished for its agricultural intelligence, industry and wealth.

CHARLES C. SEWALL.

MIDDLESEX NORTH.

The annual festival of the Middlesex North Agricultural Society was held at Lowell, on the twenty-first of September. The weather was very unfavorable. The morning cloudy and dark, with a misty rain, which increased as the day advanced, the afternoon being very rainy. The grounds of the society are pleasantly located south of the city, on which there is a half mile track, and land for ploughing; but as yet they have no hall, which makes it very inconvenient, particularly in unpleasant weather, to go a mile or more to Huntington Hall, where was had the in-doors part of the exhibition.

On entering the grounds my attention was first directed to the display of fine cattle, about eighty in number—principally of the Durham, Devon and native grades. The most of which, particularly the oxen, were of the first order. Of horses, I saw only about twenty, including some fine colts. This society does not, I believe, encourage the raising of fast horses, by giving premiums for trotting, which may account, in part, at least, for the small number present. Neither would I give premiums for speed exclusively, but in connection with other good qualities, symmetry of form, graceful movement, endurance, disposition, &c., I can see no good reason why it should

not be encouraged. It is certainly a very desirable trait in the character of this noble animal, and no man, in purchasing one, but what considers it very important.

I saw but few sheep, and those not good. The fact is, the dogs have driven the sheep from the State, and there is to-day more dogs in Massachusetts than sheep. We have a very large amount of waste, rocky and unproductive land in this State, which is better adapted to sheep husbandry than for any other purpose; and now that we have a law for the protection of sheep, will not our farmers give more attention to sheep husbandry, by which much of our worthless land will be made valuable, and the wealth of the State be thereby increased.

The ploughing was on the grounds of the society,—a light, sandy soil, with little sward, and without obstructions of any kind. Would not the desired object be better attained, by ploughing land more compact and stubborn—land with a stiff sward, which would show more fully the excellencies or defects of the plough, the skill of the ploughman, and the training and power of the team? Nine teams competed for the premiums, the work being well done. How could it be otherwise on such land?

The strength and discipline of the oxen and horses, and the exhibition of horses on the course, closed the forenoon and the out-of-doors part of the proceedings.

The exhibition at Huntington Hall was in most of its departments uncommonly good. Here were to be seen the products of the garden and the orchard, in great abundance and perfection. Never had I seen a more attractive display of vegetables and fruit, including many choice and some new varieties of hardy grapes. And I am happy to observe that there is more attention being paid to the cultivation of this delicious fruit. Every one who has a rod of ground, should have at least one choice vine. There is no fruit cultivated that pays better for the care bestowed.

The dairy was well represented by a large amount of excellent butter.

More than fifty loaves of beautiful bread were exhibited, and I am happy to know that it was not *all* made by the mothers, the daughters claiming a large share of the honor, for which I do most cheerfully give them credit. This, *young ladies*, the

making of good bread, is, as it should be, one of the most important items in the list of qualifications necessary to make a model housewife.

In the ladies' department there was the usual amount of needlework and fancy articles—the time having passed when to expect those more useful and substantial articles of household manufacture. In this department the interest is diminishing in the most of our societies. And why should it not? Some fifty cent premiums, and but few of them, and many beautiful articles not noticed, is all the encouragement they receive. Have we yet to learn that these annual festivals, if the ladies are interested, will be nobly sustained—and to secure their presence and coöperation, and an attractive display of those rich and tasteful articles of household adornment, should be an object of paramount importance?

At one o'clock a procession was formed, preceded by a band of music, and marched to French's Hall, where about eighty persons, including a very few ladies, partook of an excellent dinner served in good style. After the repast, the president, Dr. Bartlett, introduced the Hon. George S. Boutwell, the orator of the occasion. Mr. Boutwell was listened to with great attention, his subject being the duties and necessities of agriculture. Short speeches were made by other gentlemen, after which the reports were read and the premiums announced.

I cannot close this report without expressing my gratitude to Dr. Bartlett and family for great kindness and hospitality; and I shall ever remember my visit to this society with much pleasure.

SAMUEL H. BUSHNELL.

SHEFFIELD, Nov. 8, 1859.

MIDDLESEX SOUTH.

It was my privilege, as a member of the State Board of Agriculture, to attend the sixth annual show of the Middlesex South Agricultural Society, held at Framingham on the 20th and 21st days of October. The first day was mostly devoted to gathering stock and materials for the exhibition and making

the entries. The several committees made their examination, and awarded the premiums on this day. Cards were put upon the pens containing the premium animals, so the visitors might at once see which animal had won the *prize*. This I consider a good arrangement. There was a good number of horses, cattle, swine and poultry on the ground, and among them, many fine specimens of their kind. There were, in the cattle department, Ayrshires, Devons, Jerseys and short-horns, though of the latter there was not more than one or two.

The Ayrshires, owned by Mr. H. H. Peters, of Southborough, attracted the most attention. There were twelve of them on exhibition, all selected in Scotland, and imported by Mr. Sanford Howard, of Boston. Part of them were imported in 1858, and the remainder in 1859. They are finer in the bone, and of better symmetry, than those of the early importations. Four of them were in milk, and showed good dairy properties.

Mr. Peters has, within the last two years, caused to be imported for him about thirty head of this breed of cattle ; and is entitled to great credit for his liberal outlay in introducing so many of them into this country. Several good Ayrshires were also exhibited by Mr. A. L. Lewis, of Framingham, which deserve notice. He took the first premium offered for Jersey cows. Mr. Joseph Burnett, of Southborough, exhibited one of the best Jersey bulls I have ever seen. He was too thin of flesh, but his good qualities were readily noticed. He also exhibited Devons ; and Mr. William Buckminster was there with a goodly number of his well-known herd. On the whole I would say the cattle department was well and creditably supplied, both as to numbers and quality. Of horses, the show was good, but as I do not profess to be a fast horse man, or horse-fancier, I will not attempt to enumerate particular animals.

There was a capital collection of swine, both in numbers and quality, comprising many of various breeds. Mr. H. G. White, of Framingham, had some pure Essex pigs. S. and W. G. Lewis, of Framingham, showed fine pigs, a cross between the Suffolk and Mackay breeds. I. Whittemore, of Ashland, exhibited three of the Chester County breed.

The growing of swine is one of the objects demanding the constant attention of the farmer. In selecting breeding

animals of any kind, he cannot be too careful to select the *best* of any breed which his fancy or judgment may direct him to rear. The sheep story is short, for there was not even a solitary one to be seen on the show grounds.

Of the trial of working oxen, and the ploughing, I can speak favorably without comment. After the ploughing came the exhibition of Boller's patent stone lifter. Several large rocks which were judged to weigh from one to five tons each, were readily lifted from their beds with ease, and not occupying more than two or three minutes time for each one. A machine of this kind should be owned in every town where rocks abound, and should be kept constantly at work until the grounds were all cleared, and the rocks made into walls. The exhibition of domestic manufacture and fancy articles was not as numerous as I would liked to have seen. The want of carpets, rugs and blankets was readily accounted for, when I found there were no sheep here to produce the raw material.

The morning of the second day was very unpleasant, with a north-east wind, and threatening a storm. In the afternoon the threats were put in execution by the rain, which fell fast and cold, to the great discomfort of all present. Notwithstanding this, there was a large attendance of visitors. The hall and grounds were crowded with people.

The exhibition of fruits and garden vegetables was good—that of fruits uncommonly so when we take into account the great scarcity of apples all over New England. I counted 166 plates of apples, 130 of pears, and 64 of grapes, all tempting to the eye, and no doubt would have been delicious to the taste. The dinner took place in the spacious hall in the upper part of the society's building, where near five hundred partook of an ample dinner provided by J. B. Smith.

After the dinner, the address was delivered by his Excellency Governor Banks. On taking the platform he was received amid hearty applause. Subject of his address, Industrial Exhibitions, and no doubt was useful and interesting, as his addresses always are; but I cannot speak of particulars, as I was compelled to leave for the cars just as he commenced.

PAOLI LATHROP.

WORCESTER.

By appointment of the Board of Agriculture, I had the honor of attending the forty-first annual exhibition of the Worcester County Agricultural Society. Notwithstanding the formation of new societies within the county limits, dividing the strength which lies in aggregate numbers, and diverting the attention of those who have formerly given their personal aid to the parent society, the exhibition of farm products, and of stock, of all kinds, equalled that of any former year, and was very satisfactory and encouraging to all who have an abiding interest in Agriculture. The annual address was made by Hon. Josiah Quincy. The conveniences provided on the show-grounds of the society for the keeping of large numbers of stock during the exhibition, are sufficient to amply meet the wishes of exhibitors. The advantages which the society will ultimately derive from the outlay of $8,200 in constructing and fitting up a spacious building upon their fair-grounds will be as lasting as the existence of the society. The ground story of the building is appropriated to the exhibition of heavy agricultural implements; the second story is used for the exhibition of the lighter implements of agriculture, vegetables, grains and other products of the farm and the dairy, with suits of rooms for the secretary, the committee of award, and for the president and directors of the society. The third story hall is fitted with accommodations to prepare and serve a dinner for five hundred or more members of the society; also with a larder room to furnish all necessary refreshments during the continuance of the exhibition.

By giving a summary of the farmers' taxable list in Worcester County and the annual product of their farms, I can better inform you of their true condition, than by a continued statement of the doings at their late fair. The number of acres of improved land in Worcester County is 516,632. The number of acres of unimproved land is 251,083. The estimated cash value of farm lands in 1855 was $22,127,322. The sum invested in farm implements and machinery was $586,608, added to the cash value of neat and other stock, making the sum of $25,857,318. The total products of the farms in

Worcester County for the year 1855 was, $5,138,052, to which there was added, received for lumber cut from woodlands, $799,656, and from wood for fuel, $671,388. The annual return on improved lands was nearly $10 per acre. In the same year there was in grass lands (mowing) 117,116 acres, from which were cut 142,308 tons of hay, averaging one and one-fifth tons to the acre. There were cultivated in Indian corn, 16,185 acres, which produced on the average 30 bushels per acre.

Acres in oats, 9,930, which produced on the average 27 bushels per acre.

Acres in rye, 3,967, which produced on the average 13 bushels per acre.

Acres in wheat, 650, which produced on the average 15 bushels per acre.

Acres in barley, 1,890, which produced on the average 20 bushels per acre.

Acres in potatoes, 9,439, which produced on the average 96 bushels per acre.

Acres in turnips, 2,267, which produced on the average 321 bushels per acre.

Acres in carrots, 240, which produced on the average 473 bushels per acre.

Acres in onions, 24, which produced on the average 332 bushels per acre.

Beets, other vegetables and other crops, 15,064 acres, which yielded in amount $51.15 per acre.

The crop of apples for the same year was estimated at $236,492.

The crop of pears for the same year was estimated at $8,822.

The crop of cherries, cranberries, other fruit and nuts, $46,310.

The crop of hops, $22,719.

Sundry crops, amounting to the sum of $29,575.

The mowing lands are generally kept five years in grass, and grass follows grain, manured with barnyard manure ploughed in. Ketchum & Manny's mowers are most generally used. The Independent rake is used.

Grain crops. Rye, oats, wheat or barley, is generally sown on land preparatory to seeding down for grass crops.

Carrots.—From May 20th to June 1st, is here considered the best time for sowing the seed. The spaces between the rows—18 inches, and distances apart of the plants in the row—3 inches; but if the largest yield in weight is wanted from an acre, the roots may crowd each other in the rows. Carrots are stated in the report of the society in 1846, to be worth 20 cents per bushel, to feed to milch cows. The premium offered on this crop in 1846, was paid on a yield of 784 bushels per acre, and in 1848, on a yield of 1,011 bushels per acre. The same report shows the product of one acre of ground cultivated with carrots for six consecutive years. 1843, 361 bushels; 1844, 710 bushels; 1845, 736 bushels; 1846, 509 bushels; 1847, 706 bushels; 1848, 1,011 bushels; average cost of producing the same, 10 cents per bushel. In the report of 1849, the relative value of the different kind of roots for feeding to stock, compared with hay, is stated to be, viz.: hay at $12 per ton, and corn worth 75 cents per bushels. Carrots are worth 30 cents per bushel of 56 lbs.; potatoes 25 cents; ruta-bagas, 16 cents; white turnips, 12½ cents; sugar beets, 18 cents per bushel. The carrot was transplanted into favor with English farmers two hundred years ago, and has been gaining in favor there ever since as profitable in cultivation and for stock feeding. But it needs no other test of its value for feed to stock than it has already had at home to induce its general cultivation. The returns here given show but one-half acre out of every hundred under cultivation in Worcester County, cropped with carrots. Reckoning the product according to the average yield given of the crop in the county (473 bushels per acre) providing only one and one-half for each head of stock owned. As a general rule in the county, three-fifths of the cost of raising a crop of corn is credited to labor account, and the expense of weeding, hoeing and harvesting a crop of carrots at two-thirds the cost of the crop. Estimating carrots as worth in the market $10 per ton (worth $12 to $14,) and the yield per acre at 473 bushels (the average return given in the society's reports,) and comparing the crops with the returns, also given by the society, of the corn crop, 30 bushels per acre, and estimating the corn at $1 per bushel, the net profits upon an acre of carrots, if sold, would buy 40 bushels of corn, and leave a handsome surplus besides. Mangold wurzel is next in value to carrots as a

feeding crop for neat stock, and may be as easily cultivated as corn, the additional labor required to harvest it, being fully compensated by the yield.

Agricultural Implements.—The implements of agriculture which are now considered of the first necessity, were twenty years ago considered as novelties and the innovations of the day.

In 1627 there were but thirty ploughs in Massachusetts. Massachusetts now holds equal rank with other States in the manufacture of agricultural implements in our country. The factory of Ruggles, Nourse & Mason, established in this county in 1838 on a capital of ten thousand dollars, employing twenty-five men, has now a capital of three hundred thousand dollars, and has three hundred and fifty hands employed.

Ploughs manufactured in 1859,	27,000
Horse hoes,	3,000
Cultivators,	7,000
Hay and straw cutters,	10,000
Harrows,	3,000
Corn shellers,	12,000
Threshing machines,	1,000
Horse powers,	1,000
Churns,	12,000
Mowing machines,	500

Also a great variety of smaller implements of agriculture and horticulture. About one-half of the above quantities are annually exported to foreign countries.

The value of articles manufactured in the county exceeds annually, $15,000,000. "The two great divisions of labor, agriculture and manufactures, have gone onward together, each opening a market for the other, and the mechanics of Worcester County are in honor and reason bound to work zealously for the interests of the society, and to come forward, year by year, with generous contributions to its treasury.

Dairy Stock.—In 1855 there were owned in Worcester County, 43,360 milch cows and heifers, of the Durham, Devon,

Ayrshire, and Alderney breeds, pure bloods, and in cross with the native stock. Very remarkable cows at the pail have been bred and owned here, which were of told and untold varieties, as to their breed or class. The farmers of Massachusetts should rank first in comparison with the people of any other country in attention to the improvement of dairy stock. Our abundant hill-side pastures are adapted to their keeping. In Germany, Poland and Switzerland, every peasant keeps two or three cows. Milk is the cheapest food which can be provided for the family. Worcester County now exhibits a larger number of cows according to the number of homesteads of its inhabitants than any other county in the State; also a greater variety of breeds, and probably a greater proportion of valuable animals for milk than any other county, according to the whole number of animals owned. The products of the dairies of Worcester County, was in 1855, of cheese, 1,791,030 lbs., valued at $172,687; butter, 1,637,978 lbs., valued at $287,663, and in quality not excelled.

Oxen.—In 1855, 18,563 working oxen and steers were owned in the county. At the first exhibition of the society, the weight of the best ox, as offered for premium, was 1,732 lbs. In 1848 the best ox weighed 2,780 lbs., and the average weight of 15 others, then exhibited, was 2,240 lbs. The pair of steers owned and bred by Nathan Dodge, (breed one-eighth Denton short-horn, crossed with the old native Devons of Sutton,) exhibited at a late exhibition of the society, are described in their report as the most remarkable pair of oxen ever bred in New England. The writer of the report says: I have been unable to find on English records, any thing to surpass them in every particular. The gain in five years in neat stock was 5,450 head.

Horses.—In 1855, there were owned in the county 13,484 horses, valued at $1,348,484, showing an increase in value in ten years of $838,812. The increase in numbers in five years, (according to the returns made,) was 5,289, valued at $528,900, a gain of over 60 per cent. in numbers, while the gain in neat stock was less than 10 per cent. in numbers. The increasing demand for horses and their yearly increasing value in price

will justify us in calling the attention of farmers to the subject of breeding them to supply our own market, if not in sufficient numbers to also encourage a demand from abroad. In England two hundred years ago, the whole kingdom could not supply 2,000 horses to form a cavalry. By the attention given to the science of breeding, English horses are become superior to those of any other part of the world, for size and strength in draft or work horses, for swiftness and beauty in those intended for the road. While in their native country the Arabians take every precaution to keep the breeds entire, experience shows that in other countries they must continually change the races, or their horses will degenerate. The horse has become indispensable to our comfort and use. "In his native state, the verdure of the fields supplies his wants, and the climate which never knows a winter suits his constitution." Nature seems careful for the sustenance of the meanest of his creatures. Having domesticated the horse, and brought him into uncongenial climates, he demands and deserves our care.

Mules.—There are six mules owned in Worcester County. I object to the introduction of the mule. Bred between two animals, not of nature's intent, but by the exercise of man's stragetic art, opposed by nature, so great a deformity is produced in result that nature has stopped the fruitfulness of these ill-formed productions. The mule is not one of the institutions of New England, nor will it be tolerated in the community where free schools are an established institution. "The mule, instead of being a gainer by the lessons it receives, is always a loser." "The ass, of all other animals, is alone rendered feebler and more diminutive by being in a state of domestic servitude." The argument in favor of the use of the mule (its willingness to subsist upon bog grass and thistles) mislead the mind. We want no excuse for permitting the growth of weeds in our pastures, nor objections made to the economy of draining bog lands.

Care of Stock.—The society has offered generous premiums for experiments in feeding stock.

The following experiment made in feeding cut and uncut hay and other food, by John Brooks, (who farms with a reason,) to ascertain the value of different kinds of food for filling the

pail with milk, and the proportion of solid manure to the food consumed, will be a guide to practice in the future.

December 17th, 1851, commenced feeding two cows about seven months after calving; the cows were gravid and expected to calve about the last of March next; live weight, 1,600 pounds; one of them forty-four, the other thirty-one months old. Each trial continued five days:—

First five days' fed on two per cent. of live weight of cut hay, daily,	32 lbs.
Two lbs. Indian meal, hay value,	8 "
Hay value of daily food,	40 "
Hay value of five days' food,	200 "
Cost of five days' food, hay at one-half cent per lb.,	$1 00
Milk in five days,	61.875 lbs.

Cost of milk, hay at one-half cent a pound, 1.616 cents the pound, or 3.232 cents the wine quart.

Second Trial.

Fed five days on 2½ per cent. of live weight of cut hay, daily,	40 lbs.
Cut hay in five days,	200 "
Cost of five days' food, hay at one-half cent per lb.,	$1 00
Milk in five days,	60 lbs.

Cost of milk, hay at one-half cent per pound, 1.666 cents the pound, or 3.332 cents the wine quart.

These trials show that two pounds of Indian meal are very nearly equal to one-half per cent. of live weight of hay, or that one pound of meal is equal, nearly, to four pounds of good English hay.

Third Trial.

Fed five days on cut hay,	16 lbs.
Thirty-two lbs. oat straw, hay value,	16 "
Two lbs. Indian meal, hay value,	8 "
Hay value of food daily,	40 "
Hay value of food five days,	200 "
Cost of five days' food, hay at one-half cent per lb.,	$1 00
Deduct five lbs. hay and straw not consumed,	2.5
Milk in five days, 50 lbs.,	97.5

Cost of milk, hay at one-half cent a pound, 1.95 cents the pound, or 3.90 cents the wine quart. The hay and straw cut, and given wet; the meal sifted over the hay and straw. This trial seems to show that two pounds of oat straw is not equal for milk to one pound of hay.

Fourth Trial.

Fed five days on cut hay, daily,		16 lbs.
Oat straw, cut, 32 lbs., hay value,		16 "
Two lbs. Indian meal, hay value,		8 "
Hay value of five days' food,	200 lbs.	
Deduct six lbs. not consumed,	6 "	
	—	194 "
Cost of five days' food, hay at one-half cent per lb.,		$0 97
Milk in five days,		48 6-16 lbs.

Cost of milk, hay one-half cent per pound, 1.995 cents per pound, or 3.99 cents the wine quart. The hay, straw and meal were given dry; and the trial shows that dry hay, straw and meal is not so good for milk as when wet.

February 3d, 1852, commenced feeding two cows, one thirty-three months old, fourteen days after calving, live weight 1,000 pounds; the other thirty-one months old, seven months after calving, not now in calf, live weight 690 pounds. These cows were fed five days on forty-two pounds, or 2½ per cent. of their live weight, of uncut hay, and fifty pounds of flat turnips daily.

Uncut hay, daily,	42 lbs.	
Turnips, 50 lbs., hay value,	10 "	
	—	52 lbs.
Hay value of five days' food,		260 "
Cost of five days' food, hay at one-half cent per lb.		$1 30
Milk in five days,		153.625 lbs.

Cost of milk, hay at one-half cent per pound, .846 of a cent the pound, or 1.692 cents wine quart.

Second Trial.

Fed five days on cut hay, daily,	42 lbs.	
Turnips, 50 lbs., daily,	10 "	
	—	52 lbs.
Hay value of five days' food,	260 "	
Deduct five lbs. not consumed,	5 "	
	—	255 "

Cost of five days' food, hay at one-half cent per lb., $1 27.5
Milk in five days, ... 152.25 lbs.

Cost of milk, .837 of a cent per pound, or 1.674 cents the wine quart.

These cows did not eat the cut hay quite so well as the long hay on the first trial; so that, on the whole, the experiment shows a small difference in favor of cut hay.

Third Trial.

Fed same as second trial, except gave three pounds Indian meal instead of fifty pounds turnips.

Cut hay daily, ...	42 lbs.	
Three lbs. Indian meal daily, hay value, .	12 "	
	—	54 lbs.
Hay value of five days' food, ...	270 "	
Deduct ten lbs. hay not consumed . . .	10 "	
	—	260 "

Cost of five days' food, hay at one-half cent per lb., $1 30
Milk in five days, ... 153 lbs.

Cost of milk, hay at one-half cent per pound, .849 of a cent per pound, or 1.698 cents the wine quart. This trial shows that three pounds Indian meal is equal to twelve pounds English hay, or fifty pounds of flat turnips, for milk.

Fourth Trial.

Fed cut hay daily, ...	42 lbs.	
Carrots, 33 lbs., hay value, ...	11 "	
	—	53 lbs.
Hay value of five days' food, . . .	265 "	
Deduct five lbs. not consumed, . . .	5 "	
	—	260 "

Cost of five days' food, hay at one-half cent per lb., $1 30
Milk in five days, ... 150.5 lbs.

Cost of milk, hay at one-half cent per pound, .863 of a cent per pound, or 1.726 cents the wine quart. This trial shows that thirty-three pounds carrots are not quite equal for milk to fifty pounds of flat turnips or three pounds of Indian meal. The cows in all the trials had free access to water.

December 10th, 1851, commenced feeding one cow, seventy-two months old; one do., ninety-six months old; one do., forty-

eight months old; five heifers, thirty-two months old; seven heifers, twenty-two months old; four calves, nine months old; four calves, eight months old. These cattle weighed, live weight, 14,567 pounds, and were fed five days on 277 pounds of cut hay daily, and drank daily 887 pounds of water, dropped daily 668 pounds solid manure, or 2.41 pounds of manure for one pound of hay consumed.

Second trial commenced December 16th, 1851. Fed same cattle five days on 352 pounds hay daily, solid manure dropped daily 860 pounds, or 2.44 pounds for one pound of hay consumed; drank daily 868 pounds water.

February 28th, commenced feeding one cow, seventy-two months old; one do., ninety-six months old, and one forty-eight months old; three heifers, thirty-two months old, and six heifers twenty-two months old. The live weight of these cattle was 9,472 pounds. They were fed five days on 240 pounds cut hay daily; solid manure dropped daily, 594 pounds, or 2.47 pounds of manure for one pound of hay consumed; drank daily 542 pounds water.

Hay consumed in three trials, 869 pounds.

Manure dropped in three trials, 2,122.

The proportion of manure to hay is as 2.44 pounds of manure to one pound of hay. The manure weighed fifty pounds the cubic foot.

Manure, after remaining under my barn one year, weighed forty-four pounds the cubic foot, a loss of six pounds in one year, or twelve per cent. of its weight when recently dropped.

The farmers of Worcester County should call upon the officers of their society to appoint given days, during the winter months of the year, on which the members could come together and talk over the principles which lie at the foundation of success in agriculture. Such occasions would bring them into closer fellowship than they have ever been. There should be a triple bond among farmers—friendship, opinions and practice. This method, if adopted, would aid in arriving in due time at the hoped-for result.

GEORGE M. ATWATER.

WORCESTER WEST.

Worcester County is the central county of our State. It has a strong, productive soil, has always maintained its ascendancy for its fine cattle and agricultural products. From my boyhood I call to mind the high reputation of its butter and cheese. More than half a century ago the town of New Braintree furnished annually my native town, (Fall River,) large quantities of those excellent articles. The products of this county have always surpassed any other county in our State.

In 1850 the amount of corn raised in this county exceeded 476,000 bushels; potatoes, more than 733,000 bushels; 145,000 tons of hay, a greater quantity than any other county in the United States, except Oneida County, New York. The dairy this year was immense, being 1,881,823 lbs. butter, and 2,584,245 lbs. cheese.

An interesting inquiry arises here. What progress has been made from year to year? How will the products of 1860 compare with those of 1850? With all the advancement in agri cultural science, has there been a corresponding increase in product? Can the farmers of New Braintree, with the aid of their estimable housewives, furnish us with a more excellent dairy than we received from them more than fifty years ago?

Is there an improvement in soil, and can the same number of acres, under the hand of modern culture, produce a greater crop? These, and questions like these, are what most interest the farmer.

I have often thought that it would be interesting, if we could come together at our county fairs, each section prepared with statistics showing what had been done in the different pursuits.

My province, however, is to speak more particularly of the agricultural society designated as Worcester West.

This society held its ninth annual exhibition at Barre, on the 27th of September last. This beautiful, quiet village lies more than twenty miles from any railroad communication. If you approach it by the way of West Brookfield, you will find for some distance a light, stony soil, surface undulating, with many hills, from its general appearance not very productive.

As you proceed, the prospect opens upon those beautiful slopes extending to the valley, covered with verdure, revealing the true source from whence the farmer obtains his merited reward.

I arrived on the evening of the 26th, prepared to witness the arrangements for the gala day on the morrow. What first attracted my attention were those commodious pens erected by the society, numerous and well arranged, but yet too bulky to well exhibit the beautiful stock to be placed within.

The quiet stillness of the night prepared us for the ushering in of a charming day.

Cattle came from every quarter, and soon those spacious pens were filled with those fine cattle, the pride and admiration of the farmers of Worcester West. As I passed around I counted forty cows of the grade Durham, which could not be easily surpassed. They would compare well with the fine Durhams of Kentucky, which I witnessed at the National Fair at Louisville. They far excelled any thing of the kind, I have ever seen at any of our county fairs.

Nor were the fine Durhams all that were there.

Peter Howard exhibited six cows, half Devons, very beautiful.

I noticed also many fine, fat cattle, one pair especially, belonging to E. S. B. Wesson, of Hardwick, which weighed 4,350 lbs. I inquired of the owner if they were for sale. Oh no, said he, they are my working oxen; I cannot spare them from my farm.

One two-year old bull, seven-eighths Durham, which weighed 1,700 lbs.

One calf, one-half Durham, six and one-half months, weighing 660 lbs. Some very beautiful steers well matched, two pairs of which attracted my attention from their great size, one pair weighing 2,800 lbs., and the other 2,730 lbs.

The display of cattle as a whole was highly creditable.

From the high reputation of this society, I expected much, but found more.

I could speak of other departments in the exhibition, all of which commanded my attention and admiration.

The dairy especially needed no commendation of mine.

By the kind invitation of a friend I was permitted to visit the farm of John L. Ellsworth. It was truly a model farm. There the rich and extensive dairy was to be seen, and the broad acres well inclosed. There the herd of twenty-four cows, mostly of the grade Durham, feeding at the stall; there the magnificent barn, immense, literally crowded with hay, more than one hundred tons, all of which heightened my opinion of the dignity of the farmer's life.

I was unable to be present on the second day of the exhibition, but judging from what I did witness, Worcester West fully sustained her reputation among the agricultural societies of our Commonwealth.

Before I close I cannot do justice to my own convictions, without saying that of all the exhibitions I ever attended, for order and sobriety this society surpassed them all. From the time of my arrival to that of my departure, I did not see a person intoxicated, or hear the first profane word.

NATHAN DURFEE.

WORCESTER NORTH.

I attended the exhibition of the Worcester North Agricultural Society, at Fitchburg, on September 30th, according to appointment. The frequency of these exhibitions would appear at first sight to do away with the necessity of much comment, yet although a general similarity pervades them all, there are abundant occasions for criticism and suggestions growing out of slight differences, which, if properly made, may lead to improvement in their general management.

I went to the exhibition at Fitchburg with a feeling that some of its arrangements would prove failures, in consequence of an article in a local paper, somewhat indefinite in its character, but hinting at great mismanagement and general dissatisfaction. It gives me, therefore, the more pleasure to state that in every department of the occasion, I was highly gratified. The ploughing match was well contested, and the work as a whole finely performed.

The stock were generally very fine, and the number of varieties manifested a praiseworthy attention to improvement in this important branch of agriculture.

Most of the working teams performed the task allotted to them in a manner creditable to their trainers, and as a whole the working cattle were remarkably good.

The exhibition in the hall was of a very high character in all its important parts. Luscious fruits and fine vegetables (many of them, however, very much overgrown,) filled the tables to the overflowing. Butter, farm implements and the usual productions of idle ladies, entered in the bills as domestic manufactures, met the eye on every side, and collectively made a show of which the society might well be proud.

The great success of the day, however, was not, as I think, dependent so much upon the excellence of the show, as upon the efficient working of all the arrangements, reflecting the highest credit upon the officers of the society. Every thing had a time, and every thing was performed in its time, without the vociferations of self-important marshals or other officials. No military parade or brass band was brought in to distract attention from the business of the day, and another great improvement was the absence of the usual public dinner of the society, with its dull sentiments, and speeches yet more dull.

The address by Hon. George S. Boutwell, of Groton, was practical and judicious, and could not fail to make an impression in a community so evidently practical as that before which it was delivered.

As a whole, I do not hesitate to say that this exhibition met my views of what such an exhibition should be, better than any which I have ever attended.

JOHN C. BARTLETT.

WORCESTER SOUTH.

Having been appointed a delegate, by the State Board of Agriculture, to attend the annual exhibition of the Worcester South Agricultural Society, holden at Sturbridge, on the 28th

of September last, I attended to that duty, and submit the following Report:—

The weather upon that day was unpropitious, strongly indicating rain until about one o'clock in the afternoon, when the sun came out, dispelling the fears that wet weather would interfere with the pleasure of the occasion. I arrived upon the grounds occupied by the society for the exhibition of stock, about nine o'clock. From the large collection of people who thronged the village, it seemed that the surrounding towns had turned out *en masse* to celebrate the holiday, denoting that the people were interested in the fundamental occupation of the human race—agriculture. These annual exhibitions should be considered what they certainly deserve to be, the great festive gatherings of the year.

I first attended the ploughing match, which took place about one mile from the village, soon after nine o'clock, where I found eleven teams entered and ready for the contest. The ploughing was conducted with great interest and spirit, and was one of the best exhibitions of the kind that I ever attended. It was witnessed by a large collection of spectators, among whom was the worthy and efficient president of the society, Hon. O. C. Felton, to whom I am much indebted for his attention and politeness to me through the day. I returned to the village to attend the drawing match of horses and oxen, which was performed with credit to the parties engaged. Many of the animals brought forward for this occasion were very fine.

I next proceeded to the examination of the stock in the pens, where I found a few very fine cattle of the short-horn and Devon grade, and some thorough-bred Ayrshires; but the numbers were too small for a district so noted for luxuriant pastures and fine blood-stock as Worcester County is.

The exhibition of horses, as a whole, was ordinary, though there were a few valuable horses exhibited. There was a good collection of sheep and swine; the latter was superior.

The exhibition in the new and spacious hall belonging to the society, next claimed my attention. There I had expected to see a good display, and was not disappointed, for I found nearly every variety of vegetables, of the largest kinds and excellent qualities, on exhibition, which were arranged with great credit.

The exhibition of fruit, in their valuable varieties and in arrangements, were also very creditable.

I also saw on exhibition several varieties of wheat and rye, which were very fine, yielding twenty-five or thirty bushels to the acre. This is certainly very gratifying to know, that there is an increased interest taken in this very important branch of agriculture.

There was a good display of butter, cheese, and bread, and superior in quality.

The ladies' department in the hall was well filled with their handy-works of the useful and beautiful, and being tastefully arranged, made a fine display.

At two o'clock, a procession was formed by the marshal, and escorted by Joslyn's Cornet Band, from Worcester, to the town hall, where the people in large numbers sat down to tables heavily loaded with the richest and sweetest provisions of earth, to the full satisfaction of their bodily appetites. Then they adjourned to the meeting-house, where Rev. Dr. Waterman, of Killingly, Connecticut, delivered a very able and interesting address, which was listened to by a large and intelligent audience. His subject was, the use of mind in agriculture. At the close of the address the premiums were announced.

CYRUS KNOX.

HAMPSHIRE, FRANKLIN AND HAMPDEN.

The forty-first annual fair of the Hampshire, Hampden and Franklin Agricultural Society was held at Northampton the 28th and 29th of September, which was an exhibition every way worthy the resources of that section of the State. And the subscriber, delegated by the State Board of Agriculture, esteemed it a privilege to be present on the occasion. Although the mornings of each day were rather threatening in their aspects, yet the days proved auspicious and the attendance was large. The first day was devoted to the show of stock which was upon the show grounds, which are well adapted for such purposes. The exhibition of animals, in the various classes, as

your delegate was informed, fell short very much, in regard to numbers, from various causes; the change of time for the fair operated unfavorably, as many of the farmers were busy attending to the ingathering of their crops. Another cause, to a great extent, was the loss of the bridge across the Connecticut River; the difficulty of getting animals across the River prevented many upon the east side from exhibiting their animals, which would have been an ornament to the show. My anticipations were fully realized in witnessing the fine, well-matched oxen, for which the farmers in that section are famous. The farmers of Westfield, who always mean to excel in this department of the show, were present to bid defiance to all competitors of such monsters of flesh. There were fifteen yoke of oxen from Westfield, weighing from 3,400 to 5,200 lbs. per yoke. Major Taylor, who has contributed to the exhibitions of the society nearly every year since its organization, as I was informed, showed the most perfectly fatted yoke of oxen for the shambles that were upon the ground; they were five years old, weighing 4,500 lbs. This feature of the show was very attractive, and it was evident the principal interest was in that direction. The show of young stock was not numerous, but was generally of a high grade, showing that many of our farmers in that, as in other sections of the State, are giving increased attention to improved breeds of cattle. The Messrs. Lathrops, of Hadley Falls, and M. J. Smith and Son, of Smith's Ferry, exhibited some fine specimens of short-horns, which were an ornament to that, and would be to any show, in the State, especially that famous *John Bull*, the property of Paoli Lathrop, twenty-six months old, weighing 1,720 lbs., a superb animal in all respects. Also noticed a fine bull belonging to the Hadley Farmers' Club, one year old; and another from the stable of the State Lunatic Hospital, all thorough bred Durhams. Noticed some good specimens of grade stock, of the Hereford, Devon, and Alderney blood, giving conclusive evidence that such enterprise would soon decide what kind of stock will be for the interest of the farmers in that section to raise. Several good cows were observed, and large reports heard of their qualities: such as making eleven pounds of butter from one the preceding week, with nothing but common pasture feed; from another, that would give twenty quarts of milk per day at that

season. Sheep and swine did not present a very imposing appearance, being few in number, and mostly of a medium quality.

A market fair was announced to be held on the show grounds in the afternoon of the first day, but the sales were few and of small amounts; the sale was continued on the second day, but with no better success. The remainder of the time which I passed with the society was given to the exhibition in Town Hall, which was well worthy the three counties of which it was made up. Much credit is due the officers and members of the society having in charge the arrangements of such a magnificent display of fruits, flowers, vegetables, manufactured articles, &c.

Although the hall is large, it was literally filled. The show of fruit was truly surprising, as the fruit crop this year is unusually small; but through the perseverance of the Horticultural Club of the society, two broad tables stretching the whole length of the hall were covered with 576 plates of apples, 119 plates of pears, showing splendid specimens of choice varieties.

At one end of the fruit tables, in a very prominent position, was the display of flowers, which was perfectly splendid in variety, arrangement and perfection. Mrs. F. Bonney exhibited 150 varieties, arranged in pyramidal form, and Miss M. B. Kingsley a similar one of 106 varieties. These, with the contributions of fifteen others, of great variety and tasteful arrangement, gave a pleasant aspect to the general appearance of the hall, and reflected much praise to the floricultural taste and skill of the ladies. The department of domestic manufactures was well filled, and the articles were of a character to reflect much credit upon the contributors; many of them afforded pleasing evidences of patient industry, as well as delicate skill, and a keen sense of the beautiful. The show of vegetables was large and excellent. Prof. Tribus, Edward W. and George P. Clark exhibited nearly 100 varieties each.

The show of agricultural implements was good and of a character to call forth a strong expression of high esteem for the skill and workmanship of the manufacturers.

It was with deep regret I felt obliged to leave the exhibition early upon the second day of the fair, for by so doing was

deprived of many things connected with it that would have been interesting. Although this is one of the oldest organized societies in the State, it appears to be in successful operation, sustained by the energy and perseverance of practical farmers, who are reaping a satisfactory reward, in the present, to themselves, and conferring much practical benefit in their community.

JOSIAH WHITE.

HAMPSHIRE.

Agreeable to appointment by the State Board of Agriculture, I attended the Hampshire Agricultural Society's fair, which was held at Amherst on the 12th and 13th of October; but, through a mistake of our worthy Secretary, I did not arrive until the morning of the second day. I therefore cannot speak of the exhibition of stock which was on that day, with any certainty as to the quantity or quality, which I exceedingly regret; for that department is the one which I wish to view more than any other, but was informed by those who were present, and had been in former years, (and good judges) that the exhibition of stock was not so good as in former years; which I was sorry to learn, as we are progressive farmers, and ought not to go backwards, especially at these exhibitions. On arriving, the second morning of the fair, I soon made my entrance into the hall, where I found a good display of fruits very tastefully arranged on four or five tables, interspersed with bouquets and pyramids of flowers, which, considering the cold season we have had, gratified me much to see. The vegetables on exhibition were of good size and quality, but not as much as I expected to see at this fair. There were some good specimens of corn, but not as much of that as we should expect from the banks of the beautiful Connecticut. There were some fine specimens of wheat and oats, which were very heavy—oats said to weigh forty-three pounds to the bushel. There were also some very nice paintings exhibited, which are at the present day adding much to the exhibitions, showing taste as well as skill.

The exhibition of the dairy was small, especially of cheese. There were but five entries of butter, all of which looked as though the farmers' wives and daughters had not forgotten the good qualities and domestic duties of their ancestors. At ten o'clock the exhibition of horses commenced, of which there was a good number,—carriage, farm, and single,—and of which the owners might be justly proud. This part of the exhibition was conducted as such should be at all fairs,—not to show the greatest speed, but all the other good qualities combined. After the committee had finished their duties in this department, the members of the society assembled with the trustees of the college in laying the corner stone of a gymnasium for that institution. They then returned to the church, where the address was delivered by Dr. George B. Windship, of Roxbury, on physical culture, which was listened to with a good deal of attention; although the farmers have about as much of that study as the generality of mankind, they seemed pleased with the address.

Immediately after the services at the church, the members, with invited guests, adjourned to the Amherst House, and there discussed the good things of the host. After disposing of those, there were speeches from the President, Drs. Hitchcock, and Stearns, Professor Clark, and others, which were listened to with good attention; after which the company retired, seemingly satisfied with their doings, and that the social gathering had been one of mutual benefit to them all. There was one thing which I was sorry not to hear, and that was the reports of the different committees, and the awarding of the premiums to the several competitors, which is, I think, one of the most interesting parts of the exhibition, especially if it is paid in plate, which I would recommend to this old and honorable society to adopt, and which is now done by many of the societies in the State at the present day. I cannot but express my kind regards to all for their kind attentions to me on the occasion.

CHARLES K. TRACY.

HIGHLAND AGRICULTURAL SOCIETY.

Without an appointment, I attended the first fair of the Highland Agricultural Society, held at Middlefield the 14th and 15th of September, under their new charter. This society embraces parts of Hampshire, Hampden and Berkshire Counties, and has opened with very favorable prospects. They have grounds of some ten or fifteen acres, very handsomely situated on an eminence near the centre of the town, inclosed with a fence, inside of which is a track for the exhibition of horses. On the height of the eminence they have a hall for the use of the domestic manufactures, vegetables, dairy products, &c. The first day was devoted to the exhibition of stock; and although the day was very unpropitious, being very cold, with a high wind, there was a fine display of cattle and other stock. There entered their inclosure over 550 head of cattle which were entered for exhibition and premiums, most of which were of the improved breeds, Durhams and Devons predominating. I think the exhibition of cattle cannot be excelled, as to quantity or quality, in the State.

There were three town teams, of which Middlefield took the first premium, the team consisting of over eighty yoke of very fine cattle. One yoke of fat cattle was exhibited which was sold for $300, and said to weigh 5,000 lbs.; these cattle had been fatted upon grass alone. It would be impossible for me to describe all of the good stock on the ground; but this I can say: there was not any of it poor.

Their hall is too small for their use, being but sixty feet long and twenty-eight feet wide. It was well filled with dairy products, fruits, vegetables, domestic manufactures, with a good display of the needle work of the ladies, who, in the mountain towns, are not to be beaten on such an occasion as this was. The evening of the first day was spent by a social gathering of the members and others at their hall, with speeches from various persons, and music by the band. The second day, at 10 o'clock, A. M., the exhibition of horses commenced, of which there was not a large number, but good ones. After the committees had finished their duties in this department, the members formed a procession and marched to the church,

where the address was delivered by Ex-Governor Boutwell, which was a well written and instructive address. The reports of committees were then read, and the premiums delivered to the several successful competitors.

Although this society have had considerable difficulty in getting funds and their act of incorporation, I understand that they are now clear of debt, and bid fair to take a prominent place among the other societies of the State.

CHARLES K. TRACY.

EASTERN HAMPDEN.

Agreeably to appointment by the Massachusetts State Board of Agriculture, I attended the annual exhibition and cattle show of the Eastern Hampden Agricultural Society, held at Palmer on the 4th and 5th days of October.

The cattle and horses were shown upon a beautiful lot of land which had been recently purchased by a party of public-spirited gentlemen, designed to be used as a trotting park and pleasure grounds, the track of half a mile in circumference at the time being in process of completion.

The first day was devoted to the general exhibition of cattle and the ploughing match; the ploughing was well done, but the number of teams engaged was quite too small; more interest should be taken in this department.

The exhibition of working cattle and town teams of oxen was very creditable to this young society, as one hundred and fifty-two yoke of oxen were shown, the town of Wilbraham taking the first premium, sending seventy-two yoke of cattle; Monson and Brimfield were also well represented.

A fine display of young stock was made, including steers, bulls, calves and heifers; the farmers here are taking the best course to obtain good stock by raising their own, and selecting the best.

Of swine there was some good animals. One sow, owned by Hon. Cyrus Knox, appeared a superior animal, being large size and well made, admirably calculated to cross with the Suffolk.

The vegetables, fruits, bread, fancy articles, &c., were exhibited in the hall under the church; of each of these there were an abundance. Quite a number of entries of wheat were made; one specimen by Mr. Knox is worthy of notice, who raised thirty-three and one-third bushels to the acre, and exhibited an excellent loaf of bread made from the same.

Seven entries of butter, and forty-four of cheese, were made, both of which seemed of tolerable quality, so far as I could judge. More good butter ought to be made, and less of the poor, white, strong-scented stuff, which is too often shown; a little more care and attention would nearly double the price of this article.

The show of vegetables was large, and many choice specimens adorned the floor, but so much crowded together, and badly arranged, that I could not well examine them. Doctor Brewster, of the State almshouse, at Monson, made a fine display in this department, very much to his credit; such fine carrots, onions, turnips and potatoes, cannot be produced without close attention and judicious management. The example of Dr. Brewster may well be imitated by those having the charge of our various State and town farms, where the old, infirm and young can, by proper direction, produce large quantities of excellent root crops.

Of fancy articles and needlework, there was a good number of entries—the work of many a day of patient toil. Three mats, made by a lady over seventy years of age, were worthy of praise, showing much skill and good use of time.

Messrs. Blanchard & Co. exhibited excellent scythes of various kinds.

Several choice specimens of cranberries were exhibited, the general cultivation of which is attracting attention. Bottles of currant, blackberry and grape wine, of good quality, were exhibited; a more general use of these, in preference to the deleterious mixtures imported from abroad, would tend to advance the temperance cause.

Choice pears, and apples, and other fruits adorned the tables, also some fine looking shagbarks.

The second day was devoted to the exhibition of horses; several fine animals were shown. Much attention is being paid to horses in this section. To the gentlemen interested in this

stock, the credit is due for their fine show grounds. It must be admitted the horse will take the lead of all other stock, and attract the largest multitude.

At the trial of draft horses but three teams contended; the loads were rather heavy for the hill they were required to ascend.

Several elegant pairs of horses were shown, as well as brood mares and stallions. No very fast driving could be accomplished, the track, as yet, being unfinished.

E. W. B. Canning, Esq., delivered an address before the society, which was amusing and interesting. After the address a procession was formed and marched to the hotel, where an excellent dinner was provided, which closed the exercises.

The whole passed well and creditable to the officers of the society, which, though young, is taking a prominent position among our county societies.

W. G. Lewis.

FRANKLIN.

Having been appointed by the Board to visit the Franklin County Agricultural Society on the occasion of its tenth annual exhibition, I attended to that duty. The exhibition was held at Greenfield, on Tuesday and Wednesday, the 27th and 28th of September last. Tuesday morning opened beautifully, and brought to view a busy throng of people, who had come out for the purpose of seeing and being seen, of exhibiting their own productions, or to scan those of their neighbors.

My first sally was made in the direction of the cattle pens. I had heard much of the superior quality of the stock of this region, and was therefore prepared to be astonished. Notwithstanding my preparation, however, the reality did somewhat astonish me. A finer display of neat stock from one locality, it would be difficult to find anywhere. Much pains appears to have been taken by the stock-growers of this part of the State to improve the blood of their animals, and to secure those qualities by means of which their lands are made to yield the greatest return to the owner. The great end sought for appears to be the production of cattle for the stalls, and accordingly the

Durham is the breed generally met with. There were also on the ground some fine Devons, and grades of these and other breeds. A pair of two years old Durham heifers weighed 1,280 pounds each. A two years old steer 1,600 pounds. Three years old steers ranged from 2,800 pounds to 3,500 pounds, and oxen from 3,500 pounds to 4,200 pounds. That the oxen were grown almost exclusively for beef, was well illustrated in the trial of working oxen, which was appointed for eleven o'clock, A. M. This trial also exhibited some of the characteristics of a portion of the inhabitants of the region. At the time appointed I found the place designated for the trial, but could see no indication that other people had found it. I afterwards saw one of the committee, and learned from him that he did not know exactly when or where the trial would begin. After wasting an hour's time in waiting, I saw some note of preparation, and at the end of half an hour more the trial actually commenced. It seems to me that this is a grave mistake, and one which ought not to be tolerated. I could not find that the blame could be laid any where in particular. It certainly was not the fault of the secretary, who is unusually prompt in every thing appertaining to the duties of his office. It should in justice be stated that by the resignation of the efficient president, the society was left without a responsible and experienced head. It would doubtless remedy the fault on the part of the competitors if they were made to forfeit their competition for a year or two, in consequence of being behind hand; but what influence is to be used upon a tardy committee, is not so clear. The working oxen showed, in comparison with those of Worcester County, for instance, an ignorance of their duties which indicated that they felt them to be beneath their dignity. They seemed to have imbibed some aristocratic notions of pedigree, aldermanic proportions, &c., that conflicted with the vulgar idea of earning bread by the sweat of the brow. This is explained by the fact that most of the farmers devote themselves mainly to stock raising, and only work their oxen a little incidentally, so little, in fact, that the oxen never learn what even a yearling steer is expected to know in the eastern portions of the State.

There were to be seen some very fine sheep of the various breeds, Cotswold, Leicester, and South and Oxford Down. Also swine of the Chester County and other breeds.

The show in the hall was quite unsatisfactory. It seemed to me that Franklin County should have crowded the tables of that hall to overflowing, with its productions. In the matter of fruits, the display was excellent in quality, but meagre in quantity. There was enough, however, to prove that the apple and pear are entirely at home there, and nothing is needed but to awaken the people to the importance of the cultivation of these and other fruits, both as a matter of profit and luxury. Major Grennell, the secretary, made a fine display of the products of the garden and field, but he was almost alone. In many things there was really no competition. The dairy was but poorly represented, and manufactured and domestic articles not abundant. In the evening visitors were regaled with the music of a cornet band.

The morning of Wednesday set in with a drizzling rain, which promised to be a damper upon the remaining out of door exercises, being mainly the exhibition of horses. The clouds, however, had charity for the populace, and after a brief display, did not materially extend their diluting operations. In consequence of an unfortunate arrangement of the railroad trains, I was obliged to leave in the middle of the forenoon, after having got but a glimpse of some quite promising horses, and forego the pleasure of listening to the address of his Excellency, Governor Banks, and being present at the dinner.

My thanks are due to the officers, and in an especial manner to the gentlemanly secretary, for constant attention and favors.

JABEZ FISHER.

BERKSHIRE.

On no occasion have I been so highly gratified, as on my recent visit as a delegate from this Board to the association of farmers in Berkshire. For a long time I have heard of what was going on in this western section of our Commonwealth,

but I had no adequate conception of what had been done. If no other benefit accrues from our labors, much may be derived from just reports of what is seen and learned when visiting our neighbors. Farming appears to be the business of their lives, in which all engage with equal ardor, from the highest to the lowest. Here I met on the farmer's ground honored statesmen, eminent civilians, all ready to demonstrate their ability as farmers, and to hold or drive as opportunity presented. This is as it should be. Nothing can be successfully accomplished without effort. This was indeed the holiday of the farmer. Not only the men, but their wives and daughters were there, and with the aid of the fair daughters of Berkshire, what is there that cannot be done?

The farmers of Berkshire were among the first to awake to the benefit of associated effort in the management of their farms. It is forty-nine years since they organized as a corporate body, almost the first of the kind in the country; certainly there were not more than two in this Commonwealth, the Massachusetts Society, embracing the Boston farmers, and the Association of Middlesex Husbandmen. But the first society of real grit, the true, hard-handed yeomanry of the hill, was formed in 1810 at Berkshire. When once advised of the better mode of doing, they were not the men to go back again. After their plough was once started in the furrow, they never looked back until their work was done. Nor did they turn aside because of a stone here, or a slough there, but they soon found the means of removing the one and of filling the other. Consequently they soon approximated to perfection in the use of the fundamental implement of good farming. And judging from the work exhibited in the field on this occasion by more than thirty well-trained teams moving in concert, they still hold the advantage gained by their effort.

Early did they perceive the benefit to be gained by introducing stock of best quality upon their farms, fully understanding that what occupies one-half of the time of the farmer is only best done when the objects which engross his attention are of the best quality.

The Durhams are favorites here. Being sturdy and full grown themselves, they naturally thought that animals which quickly grow largest were also best. It may be so. I am not

disposed to question the judgment of men so well experienced, especially when I witnessed the fine products of the dairy displayed on this occasion. Better butter and cheese I never saw.

The second day of the show was devoted to the horse. This also was an exhibition that will compare well with any other county of the State.

The crowning glory of the exhibition was on the third day. When the sun rose over the hills in all its splendor, the refreshing breezes from the west came on to invigorate the scene, and all nature smiled around. Early in the morning a multitude of vehicles were seen wending their way over the plain, indicating a full gathering of troops ready for action. The hall was cleared as by magic, and soon the multitude were eloquently addressed by their fellow-citizen, who had well earned this distinction by his faithful services as secretary for many years, a service that more than any other tends to mark the character of the association. What is written is written, and cannot readily be rubbed out. So is it with the secretary's records. Whatever enters there is permanently fixed. Great care should be had that the secretary be of the right stamp. This has also been done in Berkshire.

Next to the address came the distribution of awards of solid implements of silver, that will remain as heir-looms when their recipients shall have mouldered in the dust.

Herein is Berkshire far in advance of all other societies I have ever seen. What could be more appropriate? what better ornament for the farmer's closet? Every time they are taken out, they will tell of his well-earned rewards. Every time they are examined by his sons, they will awaken an ambition to go and do likewise. No part of the exhibition pleased me so well as this. I was particularly pleased at the exercises of the evening at the hall. The farmers gave their experiences free of restraint. This is the talk that I like. I value such a talk of genuine farmers more than any oratorical harangues, for the good sense springing from the tried experience of the farmer never dies.

WILLIAM SUTTON.

HOUSATONIC.

Agreeably to request of a member of this Board who could have filled this place far better than I did, I attended the fair of the Housatonic Agricultural Society, held at Great Barrington, September 28th and 29th. The grounds of this society are large and finely situated, and laid out for the purposes and use of the society. The building is one hundred and fifty feet long, and sixty-four or five wide, and three stories high. The lower one is used for victualling shops, the second is the hall for the exhibition of domestic manufactures, vegetables, products of the dairy, &c. The third is a gallery in the hall. In this hall they also have their addresses. I think it is one of the finest buildings in the State for the purposes for which it is designed.

The first day was devoted to the exhibition of stock. There were nineteen yokes of working oxen, two yokes fat cattle, some forty or fifty cows, twenty or thirty bulls, six entries of fine-wool sheep, eight of coarse, seventeen of swine, two entries of improved stock, Herefords and Durhams, nineteen of farm horses, twenty-seven breeding mares with their foals by their side.

The working oxen were all fine. The fat cattle might be fed more to a profit. Out of the forty or fifty cows there were fourteen entered as dairy cows, and eleven as breeding. In this division the stock was all good. The same can be said of sheep and swine. Of the young stock there was not a large exhibition, but of a good quality. The farm horses were good. The exhibition of mares with their colts was very fine.

I think the colts were as large an exhibition as we seldom see, showing that the members of this society do not intend to be dependent on the Western States for their horses. On the grounds there was a team of two yokes of calves attached to a cart to match, driven by two boys, eight to ten years old, which attracted a good deal of attention, showing that Young America is beginning in the right way.

In the hall there was a good display of corn, vegetables, and fruit, all very good, considering the cold season.

The ladies also exhibited many fine articles of their handiwork with some very handsome pyramids and bouquets of flowers.

There were some fifty entries of butter, and thirty of cheese. Of the butter it was all nice enough to grace Queen Victoria's table. Cheese I have seen better. The exhibition in the hall as a whole was a fair one, but I was told not equal to some former ones which, I was sorry to learn, for our motto ought to be, Excelsior.

The second day at 9 o'clock the ploughing match came off, occupying some one and a half hours. There were nine entries of ox-teams. Of horses I am unable to say, as they requested me to act as one of the committee on the ox-teams. The ploughing was well done, and showed the skill of the ploughmen. This part of the exhibition generally attracts as much attention as any part of it. After this was finished, the members assembled in their large hall to listen to the address of Hon. H. W. Bishop, which was a well written production, which I think but a few heard, owing to the great amount of noise in the building which was not much to the credit of our southern friends, after which the reading of the reports of the different committees by the secretary, and delivering of the premiums to the several successful competitors, the proceedings closed.

Taken as a whole the exhibition was a good one, but not quite what I expected from our southern friends, and it may have been owing to a show of horses which was to be the next day, and at which I have learned the receipts were large, and was gotten up for the purpose of carrying out the show the three days, which, as I was informed, many were desirous of not having it continued but two. Such a division ought not to exist, but ought to be perfectly united in order to succeed well.

I must express my kind regards to our kind friend S. H. Bushnell for his hospitality on the occasion.

Charles K. Tracy.

NORFOLK.

As delegate of the Board, I attended the eleventh annual exhibition of the Norfolk Agricultural Society, which was held at Dedham, upon the grounds of the society, on the 27th and 28th of September. Having never before attended an exhibition of this society, I expected to find the best agricultural county show which I had ever attended in this State, and in many respects my anticipations were realized. The exhibition of stock, including horses, was well worth attending. In all that might be expected at an exhibition near Boston, whose suburbs are filled with wealthy gentlemen, and elegant country seats, the show was most excellent. There were fourteen entries of bulls, thirty-two of cows, and forty-five of heifers; and among them were presented the largest and best show of Jersey stock, which, I think, have ever been collected at a county show in this State, and this, although Mr. Motley's most excellent herd were not on exhibition. Grade Jersey cows, Jersey steers and oxen were also to be seen, which gave no evidence of a want of strength or hardihood, and had marks of beauty which I have seen in no other animals. If the statements of the exhibitors of Jersey milch stock at this exhibition are to be taken without qualification, and I see no reason to distrust them, they show that the Jersey stock furnish better milkers than they have credit for.

There was also on exhibition a polled bull, in part of the Suffolk, polled breed, sired by a Jersey bull, "Beverly," and called the "Jamestown," owned in Dedham, with some cows and heifers sired by him, which were very promising. The "Jamestown" came from a Suffolk cow which was presented to R. B. Forbes, when he made his errand of mercy to Ireland in the national vessel of that name, and which is now owned in Danvers. She is a superior animal, an account of which may be found in the fourth Report of the Secretary of this Board, p. 58. "Beverly" was sired by "Colonel," a first prize bull in Jersey, dam "Flora," imported by Mr. Motley. The Jamestown breed is very popular in Dedham and its vicinity.

Of horses, too; stallions, of which there were twenty entries, blood mares and stock, matched and single horses, draft horses,

mares and fillies, the show was most excellent, giving evidence that more attention has been paid of late years, not only to the keeping, but the raising of horses in Norfolk than ever before. It appears by the statistics of the industry of Massachusetts, under the census of 1845, that there were 5,886 horses valued at $359,406 in Norfolk; and from the census of 1855, we find 7,390, valued at $769,416, showing an increase of 1,404 in ten years, or more than 30 per cent. in number, whilst the increase in value is $410,016, or more than 110 per cent. This result is in great part due to the efforts of the zealous president of the Norfolk Society and his associates.

In the fruit department the failure this year was great, as compared with the well-earned reputation of this society. This was not entirely attributable to the general effects of the season, inasmuch as there was a better display at some exhibitions in the State, but was accounted for by reason of local frosts in the month of May, which were not so severely felt in Plymouth, Essex, and some other counties of the State.

Mr. Eben Wight, of Dedham, exhibited between sixty and seventy goslings raised from the eggs of a single goose during the past season. This we learned was accomplished by removing the eggs, and hatching them under hens.

In some of the departments which are best filled in the more purely farming districts, there was not so much interest displayed as I should like to have seen. Only five yoke of working oxen were entered, and three single teams, three double teams, and two horse teams for the ploughing match. If the deficiency in these departments is any indication of a want of general interest on the part of the farmers throughout the county, it is much to be regretted.

I was gratified at seeing so much encouragement offered, and such perfect accommodations for the display of flowers, which some of our societies would do well to imitate. Nothing will be lost to agriculture by the encouragement to the fullest extent, of a taste for flowers, and we can devote our efforts to no higher use than the love of beauty in every form. Make our farm-homes attractive homes, and we shall have less of the abandonment of farming, and the annual stampede of the young bone and gristle of our State from their country homes.

The spading match was one of the most interesting and exciting portions of the exhibition, and instructive withal. Not one in fifty of those who use a spade have been taught, nor has he learned himself, the art of spading. Art, we say, for there is a best way of performing the simplest work; and it is the multitude of best methods of doing little things upon a farm, or in a garden, which crown the work, and render the difference between success and failure. Let any one who wishes to see this, watch a spading match and examine the finished work. See the young Yankee, with all the life and hurry for which he is notorious, jump at his work, start off like a colt before the committee say "go," push in his spade at an angle of forty-five degrees, six inches deep, and a foot back from the last spit, turning up one small angle of earth, and leaving another angle untouched; and then see the sturdy Irish gardener, who seems to live just one foot under ground, and not to fly over it, see him place his sturdy and deliberate heels to his spade. Straight down he goes for a narrow slice, breaks it square in the subsoil, and leaves it smooth and pulverized on the surface; and as he dwells undisturbed upon his stent some minutes after the Yankee has put on his coat, and is seeking "Fresh fields and pastures new," the bright subsoil on his plot seems to rise and say, "you have found me out." This exhibition was performed in a hollow surrounded by a natural amphitheatre, which was covered by admiring thousands. We confess to a little private gratification as well as agricultural pride, when we found that it was the man who turns up the garden of the president of the society, who so "got the start of all the world and bore the palm alone."

I was glad to notice that a premium had been offered by this society for experiments in the culture of the cranberry, and that Dr. Miller, of Franklin, had, I think, some fifteen acres of meadow under culture, while Mr. Edmund Tucker, of Canton, exhibited specimens of successful culture of cranberries, grown by him upon upland.

The address by Henry F. Durant, Esq., which will speak for itself in the annual report of the Secretary, was delivered to an interested and crowded audience, and the hearty singing of a glorious original harvest ode, in which the whole audience

joined, was one of the most noticeable and commendable transactions of the day.

After a somewhat hurried but pleasant dinner, at which the president of the society called for responses from several gentlemen, the society adjourned to the grounds to witness a most excellent show of all the horses entered, where a severe shower soon dropped the curtain upon the festivities of a most successful exhibition.

CHAS. G. DAVIS.

BRISTOL.

Agreeably to appointment by the Board, I attended the exhibition of the Bristol Society, at Taunton, on the 14th and 15th days of September.

The first day was quite inauspicious, the wind blowing furiously and filling the air, at very short intervals, with almost suffocating clouds of dust.

The grounds selected for the show were about two miles from the village of Taunton, in a sterile and rather dreary region in no way suited for the purposes of an agricultural exhibition.

The tents and tables containing the fruits, vegetables, &c., were blown down early in the day, and their contents were removed to the village to be exhibited on the next day.

The ploughing match was contested with considerable energy. There were twenty-three competitors for the prizes. The ploughmen and the teams behaved well, but the ground was not such as would test the strength of the teams or the skill of the ploughmen. It was light, sandy land with very little turf upon it.

The cattle were few and mostly grade Durham and Devon. The best grade Durham on the ground was a two years old bull weighing 1,150 pounds, owned by Dr. Nathan Durfee, of Fall River. There were several pairs of grade Devon steers, small but handsome. The only thorough bred animal noticed was a fine Alderney bull, three years old, owned by Laban Wheaton, of Norton.

The fat cattle were few but good. One pair from the hospital farm weighed 4,200 pounds, and a pair owned by William H. Gifford, of Westport, weighed 3,990 pounds. Mr. Gifford had a pair of three years old steers that weighed 2,525 pounds. There were a few good milch cows. The working oxen were, in general, well matched, of fair size and in fine condition. The remainder of the neat stock was young and thrifty.

About thirty horses, of all kinds, were on the ground, and were decidedly the best part of the stock exhibited. There were several breeding mares of very fine appearance, and several colts from four months to four years of age that would grace any agricultural show in the State.

About twenty sheep were exhibited, chiefly Leicester and South Down grades. They were large and in fine condition. The swine were few in number and not worthy of particular remark. There were several kinds of fowls, whose appearance added to the show. There were several very fine specimens.

The second day was calm and beautiful, and the people assembled in greater numbers than on the first day. The fruits, vegetables, bread, butter, cheese, &c., were exhibited in a spacious hall, the walls of which and two large tables were tastefully adorned with the handiwork of the ladies and mechanics. The fruits were inferior as to quality, but well selected as to varieties. The vegetables were about an average of garden produce.

In the needlework, both useful and ornamental, and in the bread, butter, cheese, &c., the influence of the Bristol County ladies was strikingly manifested; for, in the judgment of your delegate, theirs was by far the best part of the exhibition.

The exhibition of the Bristol Society could not be regarded as a total failure, but by some well qualified to judge, it was deemed quite inferior to that of the last year. In my own humble judgment, it would not compare favorably with any county show I have ever attended.

The alleged causes of the partial failure were the boisterousness of the wind on the first day, an unfortunate choice of ground for the ploughing match, a partial failure of the crops of fruits and vegetables, and especially an existing disagreement among the members about a spot for a permanent location for their exhibitions; the southern portion of the society wishing

to locate near the centre of the county, the northern portion would locate at Taunton. A vote of the society had been obtained to locate at Taunton, and a portion of the members deeming the measure detrimental to the interests of the society as well as unfair and unjust, have, this year, with some little feeling, withheld their contributions from the fair.

At one o'clock on the second day the society with its guests moved in procession to Templar Hall, where an excellent dinner was served, and after doing it ample justice, were agreeably entertained, for about two hours, with hearing the reports of the committees and the brief but pertinent addresses of several gentlemen, among whom were the Rev. Messrs. Brigham and Atwood, of Taunton, and the Hon. George Marston, of your Board.

In closing this report I would not fail to acknowledge the very kind attentions of the president and his pleasant family, at whose princely residence I passed the nights of the 13th and 14th, and paid morning visits to his grounds and green-houses teeming with delectable fruits and flowers, surpassing in beauty and excellence, if not in quantity, all that was exhibited at the exhibition of the Bristol County show.

O. C. Felton.

PLYMOUTH.

Your committee to attend the annual exhibition of the Plymouth County Society, has attended to that duty and would report: That although this is one of the old societies of the State, it is far from being in its dotage. It is in fact as flourishing and vigorous as if its origin were but yesterday. The exhibition was at Bridgewater, on the 7th and 8th of October, two as good days as exhibitors or spectators could desire. The grounds on which the show is held contain forty-five acres, and are owned by the society. They are most beautifully located on a peninsular formed by a river, which makes an excellent fence on three sides. The grounds are diversified by hill and meadow, grove and field, and in the centre on the highest point, and overlooking the whole, is located the hall, a sub-

stantial building 137 feet by 65. The lower story is used as the exhibition room of the various articles requiring shelter, and the upper is devoted to offices, dining hall, &c. Around the base of the eminence on which the hall stands is the track for the trial of horses, and in different parts of the grounds are good substantial pens and sheds for stock. The funds of the society invested in the grounds and fixtures is $6,000, and its small debt is being fast liquidated by an income of about $2,000 annually taken at the doors of the inclosure and the hall. The average amount of premiums paid is $1,500 ; and is distributed on parts of the exhibition as follows :—Indian corn, $96 ; ploughing, $54 ; products of the dairy, $78 ; vegetables, $40 ; fast horses, $63 ; family horses, $28 ; female equestrianism, $86 ; bread, $12. The first day was occupied by the ploughing and spading matches, trial of working oxen, exhibition of family horses and stock of all kinds, interspersed with music and amusements. The ploughing match was spirited and attracted much attention. There were a large number of competitors, all of whom performed their work well, and most of them admirably. The ploughmen of old Plymouth are equal to any in the State. A deep interest seemed to be felt by all in the trial of working oxen ; and it was really a fine affair, giving evidence of thorough training by skilful teamsters, seconded by the good qualities of the cattle. If "much increase is by the strength of the ox," the members of this society are in a prosperous condition. The exhibition of neat stock in the pens, of sheep and swine, was not of the highest order. The latter particularly was meagre. There were some fair specimens of Alderneys and Devons, and a few fine cattle for the stall. An effort is being made in this county to promote sheep husbandry, but our attention was not sufficiently called to the specimens on exhibition to enable us to speak of their breed or quality. In the hall (with the exception of farm implements) the show was every thing that could be desired. The fruits, especially apples and grapes, were splendid. The vegetables were excellent, and the products of the dairy, the bread and articles of domestic manufacture, gave most satisfactory evidence of the skill, industry and capacity of the daughters of the county. The second, was the great day of the show, and its exercises were witnessed by thousands who came crowding

into town from all parts of the county. The trial of skill in horsemanship and riding by fourteen ladies, was one great feature of the day, and was first on the programme. It was a complete success. The fair competitors were put to a thorough trial, and obliged to drive their horses at all gaits and no gait at all, and at all speed from a slow amble to 2–40. They showed themselves equal to all requirements, and if female equestrianism is necessary for locomotion, for obtaining or preserving health, or qualifying the girls to become better helpmates to the sons of the county, the society has done much to further a laudable object. The trial of travelling, or fast horses, was entered into with spirit, and conducted in good order and feeling; but as your committee did not time them, and is no judge of the fancy points in such matters, he cannot speak of the merits or demerits of the trial. It seemed to please, excite and gratify the crowd. As the last and crowning feature of the out-door exercises, the animals of all descriptions were brought in front of the judges' stand, the premiums announced by the president, and different colored ribbons to denote the grade of premium tied to the animal receiving it. They then all filed off in procession around the track, giving the multitude an opportunity to see those to which the premiums were awarded and to compare them with those thought less deserving. This feature we thought a good one and would like to see it introduced at all our shows. The exercises were closed by a grand farmers' festival in the hall, where four or five hundred partook of an excellent dinner, and were entertained by the worthy president, and gentlemen from various sections of the State, on subjects connected with practical agriculture. This society seems to be favored with a corps of officers, to whose energy, activity and practical go-a-headitiveness, its success is largely due. Long may it prosper.

Levi Stockbridge.

BARNSTABLE.

The fifteenth annual fair of the Barnstable Agricultural Society, was held at Barnstable, October 5th and 6th, 1859.

The very thorough report, for 1858, prepared by Mr. Bushnell, renders it unnecessary to make any statements respecting the past history, or the convenient grounds and spacious halls of the Barnstable society. One additional fact, however, should be mentioned for the encouragement of those faint-hearted societies which have not yet provided themselves with suitable facilities for the best possible exhibition of articles and animals entered for premiums. This society having resolved to own a proper place for holding its fairs, after expending all its funds, was under the disagreeable necessity of borrowing money to complete its building. After dinner, this year, one of the invited guests, William Sturgis, Esq., of Boston, having expressed his gratification at the abundant evidences of enterprise and thrift, manifested by the society, generously presented it with the sum of $1,200, the amount of its indebtedness.

Mr. Bushnell's report on the stock in general would require but little modification for this year. Among the poultry, however, which he seems to have overlooked, were some fine ducks, (which might have been expected); a wagon-load of respectable turkeys, (not salt); and, sad to relate, a few ambitious Shanghae's, among which were dodging about some good specimens of the Grimes' breed, lineal descendants apparently of the famous "old hen with yellow legs, who laid her master many eggs."

The exhibition, in the hall, of ladies and their handiwork, of flowers, fruits and vegetables, of model ships and of salt, was well worthy the attention of the crowds which it attracted.

The crystals of salt were snow-white, and some of the cubes were nearly three inches in diameter. The manufacturers, the Messrs. Crocker, kindly permitted Secretary Flint to select such as he chose for the State cabinet, and also suitably seasoned your delegate.

The apples and pears were handsome,—much better than would have been anticipated by a stranger, who had observed

the stunted appearance of the moss-covered trees, in exposed situations.

Some fine grapes, ripened in the open air were noticed, and also a superb cluster of Black Hamburgs, from the grapery of James M. Thompson, Esq., president of the Nantucket Agricultural Society.

The cranberries were, of course, of the very best quality in size, color, and flavor, and there were on the tables abundant samples of the two principal varieties cultivated here. The demand for this delicious fruit increases so steadily with each returning harvest that the greatly increased supply does not in the least diminish the price, which for some years has been twelve or thirteen dollars per barrel for the best. This quantity is not an unusual yield for every square rod of a good yard in full bearing, which affords a greater profit by far than any other crop. Since the plant requires nothing but peat, sand, and water, of which we have an unlimited supply in Massachusetts, and especially since after the ground is prepared and covered with vines they need no care whatever, why will not the farmers in all parts of the State be induced to cultivate it? Let them apply to Secretary Flint for a copy of his admirable treatise on the "Cranberry," and learn how to convert their now useless swamps into the most valuable portions of their lands, and while enriching themselves, confer a great favor upon the multitudes of their fellow-men who, having tasted the costly fruit, are every where asking for more.

The exhibition of flowers was large and interesting, and it was quite surprising to see beautiful bouquets of wild flowers, for which premiums were very properly offered, gathered in this northern latitude in the month of October. The genial influence of the ocean prevents the occurrence of those late spring and early autumnal frosts which so often blast the hopes of the horticulturist in other parts of the State.

In the ladies' department there was a great profusion of articles wrought with remarkable taste in all the numberless ways in which cotton, linen, silk and wool may be transformed into things of beauty or of use by that most wonderful and desirable of machines, the combined sewing, knitting and weaving machine. Nowhere in New England certainly is the ingenious hand of woman more extensively or successfully employed in

the fabrication of articles belonging to this department of our fairs, than in this vicinity. This results, doubtless, from the fact that in a seafaring community women are comparatively free from the multitudinous and wearisome labors which consume the time and demand the constant attention of the farmers' wives and daughters, in more strictly agricultural districts.

The soil of this county is every where light, but with good cultivation produces most excellent crops of grass, potatoes, and garden vegetables of all sorts. The corn is rather dwarfish in appearance, with usually only one ear upon a stalk, and the entire plant is as unlike the corn of the Connecticut Valley as that is different from the same plant in Alabama. The corn-cake, however, as tested by your delegate, could not be distinguished from the best eaten elsewhere.

The officers of the Barnstable Society deserve much praise for the admirable manner in which the dinner, a most important part of the occasion, was conducted. The tables were well spread for about four hundred, and it was pleasant to see how attractive they were to the people, who pressed into the hall as if expecting to enjoy themslves and get their money's worth. Capital arrangements were also made for the intellectual portion of the entertainment, and the elevated platform at one end of the hall was filled with a fine assortment of after-dinner speakers. Among the crowd of invited guests were Hon. M. P. Wilder, Secretary Flint, Judge Russell, and Sidney Webster, Esq., of Boston; the Boston Tigers, a splendid military company under command of Major Rogers, and accompanied by Gilmore's Band; the Nantucket Band, and a large number of distinguished editors, lawyers, doctors, generals, colonels, &c., &c.

The newly elected president, Judge Marston, exhibited a degree of tact and readiness in the management of the speaking, which was quite delightful to one who has repeatedly seen the golden moments of similar occasions worse than wasted by the want of judgment and promptness on the part of the presiding officer. With the excellent address by Dr. Loring, on agricultural education; the martial music and the parade of soldiers; the festive entertainment and wise and witty speeches; and the ball, which occupied the night, the Barnstable fair

seemed an appropriate jubilee in honor of the most ancient, most important, and most mysterious of the arts.

It is to be feared that some, even of the more intelligent among the leading agriculturists of the State, do not sufficiently value the appropriate amusements of the cattle show and fair. They seem to forget that the first requisite of a successful show is the mass of people, and that, avoiding every thing really immoral, they ought to employ all legitimate means to assemble the multitude. If, then, fine horses, soldiers, firemen, feasting, humorous speeches and music are properly available and necessary for this purpose, they ought neither to disregard nor to decry them. It should also be remembered that the farmers, worn down by the incessant labors of harvest time, need as much the entertainment as the instruction which a well conducted fair is calculated to afford them, and that they will be benefited by novel sights, sounds and ideas of almost any sort not positively evil. The annual fair should be the farmer's festival, and so conducted as to render it a season of innocent recreation and of profitable instruction. By making the dinner free, or nearly so, and by holding evening meetings on the days of the fair, for lectures and free discussions, and by securing the attendance of gentlemen who could speak in an entertaining and profitable manner upon topics of practical importance, these occasions might be rendered exceedingly interesting to all classes of the people, and then constant progress in all that pertains to enlightened agriculture might be reasonably anticipated.

W. S. Clark.

NANTUCKET.

Pursuant to my appointment as a delegate from the State Board of Agriculture, I attended at the Nantucket County Cattle Show and Fair, holden October 12th and 13th. Arriving on the afternoon previous, I found at the hall and on the grounds a cheering state of forwardness, and much enthusiasm, especially among the ladies, who are here more than usually active in bringing out objects of interest, tasteful in arranging

them, and indefatigable in their endeavors to make the festival every thing that it should be.

The grounds of the society, where was holden the exhibition of stocks, contain about twenty acres of level land, inclosed by a well-built, sufficient fence, and having a smoothly finished track, and ample stands for the committees and the band. The question of the expediency of agricultural societies owning their own grounds, and taking an admission fee from those who are not members, is no longer an open one, and the people of the island are fortunate in thus being able to make their society self-sustaining before the evil days come when the gratuity of the Commonwealth shall be no longer granted.

The receipts of this young society were over seven hundred dollars. Captain E. W. Gardner, the first president of the society, has been largely instrumental in forwarding this great improvement.

Of the stock exhibited on the first day, the milch cows constituted the largest and most noticeable class, and excellent cows they were, too. There were some capital heifers, and some very good bulls—one a full blooded Ayrshire "Bruce," from the stock of William S. Lincoln, of Worcester.

Several of the best dairies on the island, as I was informed, were not represented at all. It is to be hoped that after the successful experiment this year of the new grounds, the earnest spirit of the officers will extend to all the members.

I was disappointed in seeing only one lot of sheep; they looked well, and formed part of a fine flock, which I afterwards saw belonging to George C. Gardner.

I was informed that there were other good flocks on the island, and could but regret the lack of public spirit that should withhold them from this exhibition, which, of all others in the State, would seem to be the one to receive undivided encouragement.

Of swine there was but one lot, which looked well.

There were two or three coops of poultry.

In the hall the exhibition was very fine; there were many articles of curiosity, interest and taste, beside the fruits and vegetables, of which there was a splendid show. I have never seen better pears, and never so good Isabella grapes and quinces as were here exhibited in large quantities; the adaptability of

the soil to the production of these most valuable fruits was every where manifested by the profusion in which they every where grew, when any attention was paid to their cultivation.

The roots, too, were as fine as ever grew. Turnips, Swedes, carrots and mangolds were all shown of the best.

There were five entries of butter, some of which was very superior, and a cheese, excellent in appearance, made by Mrs. Charles C. Folger, deserves most creditable mention, as being the first one made in Nantucket within the memory of this generation.

In the evening the hall was crowded, and the time agreeably passed in social intercourse, listening to charming music by a glee club of the town, and to remarks by different gentlemen.

The delegate had the honor to respond to a sentiment complimentary to the State Board.

The morning of the second day was occupied in the exhibition of horses, of which there was a very fair show of driving horses, but no trials of speed that would have disturbed the equanimity of even the most fastidious member of the Board for 1856. There was one fine stallion, "Rising Sun," brought from Maine, and some very promising colts. At two o'clock was the ploughing match, in which competed six teams. The work was well done, though the furrow was shallower than is customary in other counties.

At four o'clock, under the escort of the Nantucket Cornet Band, which played exceedingly well on both days, we marched to the church, where we listened to a most admirable address from Dr. George B. Loring.

The hall was again densely crowded in the evening, and all were pleased and instructed by the music and by the very happy remarks of Dr. Loring, Judge Marston, and Maj. Phinney, of the Barnstable Society.

Through the kindness of Capt. Gardner, I was enabled to see the whole island, and to visit several farms, and I was surprised to witness its capacity as an agricultural district, and its susceptibility of improvement.

The island contains about 20,000 acres of unimproved and uninclosed land. The soil is light, easily worked, and most kindly in its reception of seed and return of harvest. The land that has once been improved shows for years most unusual

results. The best grass grows there spontaneously, if it be proper so to speak. I saw more than one field in which, after one or two years of cultivation of corn, a heavy sward of Timothy had formed from seed sown by no mortal hand. This peculiar adaptedness to grass bearing was not only everywhere visible to the eye, but especially perceptible to an observant person in the soft, elastic, velvety feeling of the sod beneath the foot, and this not only on cultivated fields, but in corners of the roads and any sheltered spots where nature had been assisted by any fertilizing stimulants. I saw many fields which, after two or three years cultivation to corn, had for years yielded from two to three tons annually of the best hay at the first cutting, and a good crop of rowen following. There are in the island in various places, inexhaustible beds of peat or muck, black, pasty, decomposed vegetable matter, which, after being dug out, worked over and dried, is very extensively used for fuel. The freeness with which it burns shows it to be almost entirely organic matter, and of course the most valuable substance the farmers could have with which to qualify their light soil; indeed the effect of it upon the grass, when it has been laid out to dry for fuel, can be distinguished by its dark green as far as the eye can see.

The importance and value of this are inestimable; it is every thing that is needed, and the expense of getting it out a mere trifle. Great quantities of kelp and sea-weed can also be collected, which makes a most valuable manure.

Several kinds of fish, at some times and places, can be very readily caught, furnishing the strongest of fertilizers. It does seem to me that there is no part of the Commonwealth better adapted to the growth of grass than Nantucket, and I have been taught to believe that a "grass farm" was one of the most desirable pieces of property to own or work, that we are permitted to hold. I never saw better roots than I saw there, both harvested and growing. Turnips, mangolds, carrots and Swedes, in size, productiveness, uniformity, freedom from vermin, and thriftiness of growth, were superlative.

About eight thousand bushels of corn are annually raised upon the island, to get which they plant nearly four hundred acres, being an average of but little over twenty bushels to the acre. With diffidence I would suggest that they should plant

less land and get more corn. I saw many fields of corn unfit to be harvested on October 15th, planted far apart, stalks large and sparsely set, having only one ear to the stalk, and that with a large kernel, and a great sappy cob which would scarcely ever dry. In several of these fields I observed an occasional chance stalk of small, yellow corn, such as is common in the western part of this State. In every instance the husk was entirely dry and separated, having the golden ear hard enough for the mill, standing boldly out from among the green stalks of the larger kind. The natural suggestion was, that this small, early, prolific corn should be grown, ripening fifteen days at least earlier than the larger kind, planted not four feet apart, but two and a half by three, growing with a low stalk, not liable to be swept by the fierce winds, and yielding from sixty to eighty bushels to the acre, as it does in other counties.

The only reason for the system pursued seemed to be, that this large white corn had been found there at the settlement of the island, and was supposed on that account to be the best adapted to the climate and soil.

So far as climate is concerned in vegetation, Nantucket is by far the most favored part of this Commonwealth. In the past year (1858) it had 233 days without frost, from March 23 to November 12, while all other reported parts of the State counted only from 144 to 160; the lowest temperature in winter was eight degrees higher than in Worcester, eighteen higher than in Princeton, twenty-five higher than in Franklin County. On the Connecticut River we should feel that we could receive no greater blessing than to have our seasons lengthened to three-quarters of that of Nantucket.

The violent winds which sweep over the island are an objection to the raising of some crops; but let attention be paid then to raising crops that are not so exposed, such as grass, the various kinds of roots, and a smaller variety of corn.

The introduction of the Ayrshire breed of cattle upon the island, where are kept between 700 and 800 milch cows and heifers, is undoubtedly a judicious move. The Ayrshires are great milkers, patient of scanty herbage, hardy, and make beef of a very good quality, when put upon rich pastures or high feed. So few working oxen are used upon the island—about 120 yoke of oxen and steers—that it is not essential here to

breed with reference to draft. Of swine there is no reason why they should not have the best of all the improved breeds. Over 500 hogs are annually raised. But of all branches of agriculture, and of places suited for it, sheep raising is the business and Nantucket is the place. As early as 1653, Capt. Humphrey Atherton obtained leave from the old Provincial Government to pasture sheep on the Island of Nantucket, subject to the rules of the Colony regulating the keeping of sheep.

From that time till about a dozen years ago, sheep have been kept upon the island in great numbers, running at large upon the uninclosed lands, of which there are several thousand acres. About twelve years since, some of the owners of the common lands, who were not owners of sheep, determined that the lands should not be fed, and proceeded to impound all sheep going at large; a bitter strife arose, which resulted in driving the sheep from the commons, and the island, and none are now kept except in inclosures, there being now only some 1,200 to 1,500 in all; while the thousands of acres which might be so profitably used are growing up to foul weeds and bushes. The extermination of sheep seem to me to have been a great mistake, and they who did it, like "the base Indian, threw away a pearl worth half his tribe." The number of sheep at that time was about eight thousand; they averaged three pounds of wool to the fleece—worth perhaps 35 cents per pound, which would be $8,500. The lambs, carcases, and pelts would easily bring enough to make an annual income from the sheep, of ten thousand dollars.

I see no reason why this land, more profitable and more valuable for sheep raising than for any thing else, should not be profitably occupied by the employment of shepherds to tend and herd the sheep. In Scotland, Spain, France, Texas and New Mexico, the sheep are pastured the year through on moors, prairies or vast uninclosed lands, from 500 to 600 being under the charge of one shepherd, who, with his dogs, manages them completely.

The wages of a shepherd would not be very high, and he might not be wanted in winter when the sheep are put up—at any rate, when divided on each sheep, the amount would be very small, much less than would be the cost of pasturing elsewhere, or the interest on the cost of fencing an equal amount

of land. Formerly, when the sheep ran at large without shepherds, they became very unruly, and constantly trespassed upon the cultivated fields, unrestrained by the insufficiency of the fences—and undoubtedly it was a great nuisance. The fields are generally poorly fenced on account of the entire want of fencing material on the island—one would suppose that hedging would have been resorted to years ago. These lands were originally conveyed by Francis Lovelace, Governor of New York, in 1671; in 1717, under a statute of Queen Anne, they were made into a property in common, and though much has been set off in severalty, yet it is all open and uninclosed.

It would seem as if this great tract of land, so suitable for a specific purpose, and utterly valueless except for that, should be made available, even if it is necessary to resort to further legislation.

I believe that the Island of Nantucket contains the essentials of a high state of agriculture. Within five years the cattle and cows were increased one-third, the horses almost quadrupled, the swine trebled, the crop of hay has been doubled, and the Indian corn almost trebled.

Undoubtedly as the maritime and commercial business declines, the attention, energy and skill of the people will be directed to the cultivation and development of the resources of the soil, as a leading profession—and to the prescriptive boast of Nantucket—of brave and daring sailors, and intelligent and beautiful women, will be added that of skilful and successful farmers, and accomplished farmer wives and daughters.

To the officers of the society, to Capt. E. W. Gardner, and A. J. Morton, Esq., I am especially indebted for courtesies, information, and opportunities of observation.

James S. Grennell.

MARTHA'S VINEYARD.

The undersigned, delegate of the Martha's Vineyard Agricultural Society, charged with the duty of presenting to this Board a history of that society, and a report of its first exhibition, respectfully submit the following:—

In the spring of '58 one of the principal officers of the Coast Survey, having a few years previously purchased a farm on the island, became strongly impressed, during his official visits to every part of it, that great agricultural improvements might be made by the development of its natural resources, in marine manures and vegetable deposits, stimulated by association and the bounty of the State. He communicated his ideas to two or three of the leading men of the county, the result of which was a call for a meeting which was numerously attended by the farmers and citizens generally. A society was formed and a constitution adopted, committees appointed to obtain subscriptions, which reported at a subsequent meeting, that they had collected in notes bearing interest and cash the sum of $1,600 and upwards. It was then resolved to hold a fair in October, which was very successful, increasing the funds of the society as well as its popularity. At a meeting in December, it was voted to petition the legislature for an Act of incorporation, which was granted in February of the following year, and adopted by the society in March at a meeting held for that purpose. At the same time a committee was appointed to purchase a lot and erect a suitable building in West Tisbury, the geographical centre of the county. The committee purchased the lot of two and a half acres, and contracted for a hall of ample dimensions, and two stories in height, which was completed on the first of October last.

The first exhibition of this flourishing society was held on the 12th and 13th of October, two of the brightest of autumnal days. At an early hour nearly or quite half of the population of the island were on the ground. "Woman" in all her bravery and beauty was there in gratifying numbers, and to her the society was indebted for the tasteful decoration of their rooms with evergreen and flowers, as well as their own hands with the pencil and needle. On entering the exhibition room I beheld a profusion of samples of Indian corn tastefully arranged in bundles; all the varieties of root crops, including a dozen kinds of potatoes, very large and attracting much attention; samples of spring wheat, one of which was from an acre and sixteen rods, which produced twenty-two bushels, weighing sixty-four pounds to the bushel, which was raised without any extraordinary attention or manuring, proving that

the soil was well adapted to that grain, which was of the red-bearded kind. I was happy to hear the exhibitor manifest his intention of sowing four acres on similar soil, in the coming spring. Of fruit there were presented some half-dozen varieties of apples, among which I was glad to see a fine specimen of the vineyard russet, an apple of great local celebrity, and which I have not found elsewhere. There were likewise some fine varieties of the pear, and a few samples of Isabella grapes.

The show of the products of the dairy was very satisfactory.

On the second day farm animals were exhibited on the grounds of the society. There were about sixty head of neat cattle, including twenty pairs of working and fat oxen, milch cows and calves, bulls and other store cattle, which were examined with much attention. The fat cattle would average about 2,000 to 2,200 pounds dressed weight, and a number of them were taken at satisfactory prices by a New Bedford butcher.

There were four competitors in the ploughing match. The work was performed well and in brief time, without any noise or confusion.

There was a fine display of horses, mares and colts, and I am glad to say the island is improving very much in the breed of that noble animal. Instead of the wind-galled and spavined jades that have been imposed on us by unprincipled jockeys from abroad, we now raise from sound stock a valuable animal suitable for all the sober uses of the farm.

There were only two pens of sheep, but they were owned by two of our best shepherds, and I know that their flocks averaged above three pounds each at an annual expense of scarcely fifty cents per head.

Of swine there were scarcely half a dozen on exhibition. A fine Suffolk boar, said to be a descendant of the royal pens of Victoria, was much admired, and a sow, although not in high flesh, brought with her a plump progeny of half a score, which speedily found a good market.

Of the feathered tribes there was an immense gathering—turkeys, geese, wild and tame, ducks, and hens of all shades in color and grade of blood, beautiful to behold.

At the primitive hour of one, dinner was summoned, when about one hundred persons seated themselves in the upper

hall at a bounteous repast, and after a practical support was given to the *constitution*, a succession of short speeches, historical reminiscences, anecdotes and humorous statements followed, until the declining sun admonished the prudent farmer of "chores" at home, when all left greatly delighted with their two days' entertainment, such as they never before had enjoyed.

Thus, happily, ended the first exhibition of the Martha's Vineyard Agricultural Society, which, in the short space of eighteen months, finds itself in possession of property to the amount of $4,500, and has awarded $400 in premiums and gratuities. With the blessing of a kind Providence, I trust that this humble effort is but the dawn of a bright day of benefit to the people of the county, and that it will add something to the advancement of the noble science of agriculture.

CHARLES B. ALLEN.

APPENDIX.

CATALOGUE OF PLANTS.

Most of the plants enumerated in the following list were collected by Dr. EDWARD JARVIS and CHARLES JARVIS, and deposited in the Cabinet by the former. A portion was collected by Dr. HENRY LITTLE, of Boston, and presented to the Cabinet by Dr. CHARLES PICKERING. These collections have been examined and arranged by CHARLES J. SPRAGUE, and owing to the number of duplicate specimens, it has not been thought necessary to catalogue them separately. In addition to the above named collections, many acquisitions have been added during the present year.

Ranunculaceæ.

Clematis Virginiana, L.
Anemone Virginiana, L.
nemorosa, L.
Hepatica triloba, Chaix.
Thalictrum anemonoides, Mx.
dioicum, L.
Cornuti, L.
Ranunculus aquatilis, L. var. divaricatus.
Purshii, Richards.
Flammula, L. var. reptans.
Cymbalaria, Pursh.
abortivus, L.
sceleratus, L.
Pennsylvanicus, L.
fascicularis, Muhl.
repens, L.
bulbosus, L.
acris, L.
muricatus, L.
Caltha palustris, L.
Coptis trifolia, Salis.
Aquilegia Canadensis, L.
Delphinium Consolida, L.
Actæa spicata, L. var. rubra, Mx.
var. alba, Mx.
Cimicifuga racemosa, Ell.
Nigella Damascena, L.

Magnoliaceæ.

Liriodendron Tulipifera, L.

Berberidaceæ.

Berberis vulgaris, L.
Caulophyllum thalictroides, Mx.
Podophyllum peltatum, L.

Cabombaceæ.

Brasenia peltata, Pursh.

Nymphæaceæ.

Nymphæa odorata, Ait.
Nuphar advena, Ait.
Kalmiana, Pursh.

Saraceniaceæ.

Sarracenia purpurea, L.

Papaveraceæ.

Argemone Mexicana, L.
Chelidonium majus, L.
Sanguinaria Canadensis, L.

Fumariaceæ.

Corydalis aurea, Willd.
glauca, Pursh.
Fumaria officinalis, L.

Cruciferæ.

Nasturtium palustre, D. C.
Cardamine rhomboidea, D. C.
hirsuta, L.
Arabis Canadensis, L.
Barbarea vulgaris, R. B.
Sisymbrium officinale, Scop.
Sinapis nigra, L.
Draba verna, L.

Lepidium Virginicum, L.
Capsella Bursa-pastoris, Mœnch.
Cakile Americana, Nutt.
Raphanus Raphanistrum, L.

Violaceæ.

Viola lanceolata, L.
primulæfolia, L.
blanda, Willd.
palustris, L.
cucullata, Ait.
sagittata, Ait.
pedata, L.
Muhlenbergii, Torr.
striata, Ait.
pubescens, Ait.
tricolor, L.

Cistaceæ.

Helianthemum Canadense, Mx.
Hudsonia ericoides, L.
tomentosa, Nutt.
Lechea major, Mx.
thymifolia, Pursh.
minor, Lam.

Droseraceæ.

Drosera longifolia, L.

Parnassiaceæ.

Parnassia Caroliniana, Mx.

Hypericaceæ.

Hypericum pyramidatum, Ait.
perforatum, L.
ellipticum, Hook.
mutilum, L.
Canadense, L.
Sarothra, Mx.
Elodea Virginica, Nutt.

Caryophyllaceæ.

Dianthus Armeria, L.
Saponaria officinalis, L.
Vaccaria vulgaris, Host.
Silene stellata, Ait.
inflata, Smith.
antirrhina, L.
noctiflora, L.
acaulis, L.
Agrostemma Githago, L.
Honkenya peploides, Ehr.
Arenaria serpyllifolia, L.
Mœhringia lateriflora, L.
Stellaria media, Sm.
longifolia, Muhl.
borealis, Big.
Cerastium vulgatum, L.
nutans, Raf.
Sagina procumbens, L.
Spergularia rubra, Pers.
Spergula arvensis, L.
Anychia dichotoma, Mx.
Scleranthus annuus, L.
Mollugo verticillata, L.

Portulacaceæ.

Portulaca oleracea, L.
Claytonia Virginica, L.

Malvaceæ.

Malva rotundifolia, L.
Sida Napæa, Cav.
Abutilon Avicennæ, Gært.
Hibiscus Moscheutos, L.
Trionum, L.

Tiliaceæ.

Tilia Americana, L.

Linaceæ.

Linum Virginianum, L.
usitatissimum, L.

Oxalidaceæ.

Oxalis Acetosella, L.
violacea, L.
stricta, L.

Geraniaceæ.

Geranium maculatum, L.
Robertianum, L.

Balsaminaceæ.

Impatiens pallida, Nutt.
fulva, Nutt.

Anacardiaceæ.

Rhus typhina, L.
glabra, L.
venenata, D. C.
Toxicodendron, L.

Vitaceæ.

Vitis Labrusca, L.
cordifolia, Mx.
Ampelopsis quinquefolia, Mx.

Rhamnaceæ.

Ceanothus Americanus, L.

Celastraceæ.

Celastrus scandens, L.
Euonymus atropurpureus, Jacq.
Americanus, L.

Sapindaceæ.

Staphylea trifolia, L.
Æsculus Hippocastanum, L.
glabra, Willd.
Acer Pennsylvanicum, L.
spicatum, Lam.
saccharinum, Wang.
dasycarpum, Ehr.
rubrum, L.

Polygalaceæ.

Polygala sanguinea, L.
cruciata, L.
verticillata, L.
polygama, Walt.
paucifolia, Willd.

Leguminosæ.

Lupinus perennis, L.
Genista tinctoria, L.
Trifolium arvense, L.
pratense, L.
repens, L.
procumbens, L.
Melilotus officinalis, Willd.
Medicago sativa, L.
lupulina, L.
Robinia Pseudacacia, L.
viscosa, Vent.
hispida, L.
Tephrosia Virginiana, Pers.
Desmodium nudiflorum, D. C.
acuminatum, D. C.
rotundifolium, D. C.
paniculatum, D. C.
Canadense, D. C.
Lespedeza violacea, Pers.
hirta, Ell.
Lespedeza capitata, Mx.
Vicia sativa, L.
Cracca, L.
Lathyrus maritimus, Big.
palustris, L.
Pisum sativum,
Phaseolus diversifolius, Pers.
Apios tuberosa, Mœnch.
Amphicarpæa monoica, Nutt.
Baptisia tinctoria, R. Br.
Cassia Marilandica, L.
Chamæcrista, L.
Gleditschia triacanthos, L.

Rosaceæ.

Prunus Pennsylvanica, L.
Virginiana, L.
serotina, Ehr.
domestica, L.
Spiræa opulifolia, L.
salicifolia, L.
tomentosa, L.
lobata, Murr.
Gillenia trifoliata, Mœnch.
Agrimonia Eupatoria, L.
Sanguisorba Canadensis, L.
Geum album, Gmel.
Virginianum, L.
strictum, Ait.
rivale, L.
Potentilla Norvegica, L.
Canadensis, L.
argentea, L.
Anserina, L.
fruticosa, L.
tridentata, Ait.
palustris, Scop.
Fragaria Virginiana, Ehr.
Dalibarda repens, L.
Rubus odoratus, L.
triflorus, Richardson.
strigosus, Mx.
Rubus occidentalis, L.
villosus, Ait.
Canadensis, L.
hispidus, L.
Rosa Carolina, L.
lucida, Ehr.

Rosa rubiginosa, L.
Cratægus Oxyacantha, L.
coccinea, L.
tomentosa, L.
Pyrus Malus.
arbutifolia, L.
aucuparia, Gært.
Amelanchier Canadensis, T & G. var. Botryapium.

Melastomaceæ.

Rhexia Virginica, L.

Lythraceæ.

Ammannia humilis, Mx.
Lythrum hyssopifolia, L.
Salicaria, L.
Nesæa verticillata, H. B. K.

Onagraceæ.

Epilobium angustifolium, L.
palustre, L. var. lineare.
Epilobium coloratum, Muhl.
Œnothera biennis, L.
fruticosa, L.
pumila, L.
Ludwigia alternifolia, L.
palustris, Ell.
Circæa Lutetiana, L.
alpina, L.
Proserpinaca palustris, L.
Myriophyllum tenellum, Big.

Grossulaceæ.

Ribes hirtellum, Mx.
prostratum, L'Her.
floridum, L.
rubrum, L.
aureum, Pursh.

Passifloraceæ.

Passiflora lutea, L.

Cucurbitaceæ.

Sicyos angulatus, L.
Echinocystis lobata, Torr & Gr.
Cucumis sativus.

Crassulaceæ.

Sedum Telephium, L.
Penthorum sedoides, L.

Saxifragaceæ.

Saxifraga Virginiensis, Mx.
Saxifraga Pennsylvanica, L.
Heuchera Americana, L.
Mitella diphylla, L.
Tiarella cordifolia, L.
Chrysosplenium Americanum, Schwein.
Philadelphus coronarius, L.

Hamamelaceæ.

Hamamelis Virginica, L.

Umbelliferæ.

Hydrocotyle Americana, L.
umbellata, L.
Sanicula Marilandica, L.
Daucus Carota, L.
Pastinaca sativa, L.
Archangelica atropurpurea, Hoffm.
Æthusa Cynapium, L.
Ligusticum Scoticum, L.
Thaspium aureum, Nutt.
trifoliatum, Gray.
Zizia integerrima, D. C.
Cicuta maculata, L.
bulbifera, L.
Sium lineare, Mx.
Cryptotænia Canadensis, D. C.
Osmorrhiza longistylis, D. C.
Conium maculatum, L.
Coriandrum sativum.

Araliaceæ.

Aralia racemosa, L.
hispida, Mx.
nudicaulis, L.
trifolia, Gray.

Cornaceæ.

Cornus Canadensis, L.
florida, L.
circinata, L'Her.
stolonifera, Mx.
paniculata, L'Her.
alternifolia, L.
Nyssa multiflora, Wang.

Caprifoliaceæ.

Linnæa borealis, Gronov.
Symphoricarpus racemosus, Mx.
Lonicera sempervirens, Ait.
Diervilla trifida, Moench.

Triosteum perfoliatum, L.
Sambucus Canadensis, L.
pubens, Mx.
Viburnum nudum, L.
prunifolium, L.
Lentago, L.
dentatum, L.
acerifolium, L.
Opulus, L.
Lantanoides, Mx.

Rubiaceæ.

Galium Aparine, L.
asprellum, Mx.
trifidum, L.
triflorum, Mx.
pilosum, Ait.
circæzans, Mx.
boreale, L.
Cephalanthus occidentalis, L.
Mitchella repens, L.
Oldenlandia purpurea, Gray, var. longifolia.
Oldenlandia cærulea, Gray.
Spigelia Marilandica, L.

Dipsaceæ.

Dipsacus sylvestris, Mill.

Compositæ.

Vernonia Noveboracensis, Willd.
Liatris scariosa, Willd.
Eupatorium purpureum, L.
pubescens, Muhl.
sessilifolium, L.
perfoliatum, L.
Mikania scandens, L.
Sericocarpus solidagineus, Nees.
conyzoides, Nees.
Aster corymbosus, Ait.
undulatus, L.
multiflorus, Ait.
tenuifolius, L.
puniceus, L.
Erigeron annuum, Pers.
strigosum, Muhl.
Diplopappus linariifolius, Hook.
umbellatus, T. & Gr.
cornifolius, Darl.
Solidago latifolia, L.
stricta, Ait.
rigida, L.
sempervirens, L.
arguta, Ait.
odora, Ait.
nemoralis, Ait.
Canadensis, L.
lanceolata, L.
Rudbeckia laciniata, L.
hirta, L.
Helianthus strumosus, L.
decapetalus, L.
Coreopsis trichosperma, Mx.
verticillata, L.
Bidens frondosa, L.
chrysanthemoides, Mx.
Beckii, Torr.
Maruta Cotula, D. C.
Achillea Millefolium, L.
Leucanthemum vulgare, Lam.
Matricaria Parthenium, L.
Tanacetum vulgare, L.
Gnaphalium uliginosum, L.
Antennaria margaritacea, R. Br.
plantaginifolia, Hook.
Senecio aureus, L.
Centaurea Cyanus, L.
nigra, L.
Cirsium muticum, Mx.
Cichorium Intybus, L.
Cynthia Virginica, Don.
Leontodon autumnale, L.
Hieracium Canadense, Mx.
Gronovii, L.
venosum, L.
Nabalus altissimus, Hook.
Taraxacum Dens-leonis, Desf.
Lactuca elongata, Muhl.
Mulgedium leucophœum, D. C.
Sonchus asper, Vill.

Lobeliaceæ.

Lobelia cardinalis, L.
inflata, L.
spicata, Lam.
Dortmanna, L.

Campanulaceæ.

Campanula aparinoides, Pursh.
glomerata, L.
Specularia perfoliata, A. De C.

Ericaceæ.

Gaylussacia dumosa, T. & G.
frondosa, T. & G.
resinosa, T. & G.
Vaccinium macrocarpon, Ait.
stamineum, L.
Pennsylvanicum, Lam.
corymbosum, L.
Chiogenes hispidula, T. & G.
Arctostaphylos Uva-ursi, Spreng.
Epigæa repens, L.
Gaultheria procumbens, L.
Cassandra calyculata, Don.
Andromeda polifolia, L.
ligustrina, Muhl.
Clethra alnifolia, L.
Kalmia latifolia, L.
angustifolia, L.
Azalea viscosa, L.
nudiflora, L.
Rhododendron maximum, L.
Rhodora Canadensis, L.
Ledum latifolium, Ait.
Pyrola rotundifolia, L.
elliptica, Nutt.
chlorantha, Swartz.
secunda, L.
Moneses uniflora, Gray.
Chimaphila umbellata, Nutt.
maculata, Pursh.
Monotropa uniflora, L.
Hypopitys, L.

Aquifoliaceæ.

Ilex verticillata, Gray.
Nemopanthes Canadensis, D. C.

Ebenaceæ.

Diospyros Virginiana, L.

Plantaginaceæ.

Plantago major, L.
maritima, L.
lanceolata, L.

Plumbaginaceæ.

Statice Limonium, L.

Primulaceæ.

Trientalis Americana, Pursh.
Lysimachia stricta, Ait.
quadrifolia, L.
ciliata, L.
lanceolata, Walt.
Naumburgia thyrsiflora, Reich.
Glaux maritima, L.
Anagallis arvensis, L.

Lentibulaceæ.

Utricularia inflata, Walt.
vulgaris, L.

Bignoniaceæ.

Catalpa bignonioides, Walt.
Martynia proboscidea, Glox.

Orobanchaceæ.

Aphyllon uniflorum, T. & Gr.

Scrophulariaceæ.

Verbascum Thapsus, L.
Blattaria, L.
Lychnitis, L.
Linaria Canadensis, Spreng.
vulgaris, Mill.
Mimulus ringens, L.
Gratiola aurea, Muhl.
Ilysanthes gratioloides, Benth.
Veronica officinalis, L.
Gerardia purpurea, L.
quercifolia, Pursh.
pedicularia, L.
Castilleia coccinea, Spreng.
Pedicularis Canadensis, L.
Melampyrum Americanum, Mx.

Verbenaceæ.

Verbena hastata, L.
urticifolia, L.
Phryma Leptostachya, L.

Labiatæ.

Teucrium Canadense, L.
Mentha piperita, L.
Canadensis, L.
Lycopus Virginicus, L.
Europæus, L.
Hyssopus officinalis, L.
Pycnanthemum muticum, Pers.
lanceolatum, Pursh.

Pycnanthemum linifolium, Pursh.
Origanum vulgare, L.
Thymus serpyllum, L.
Calamintha Clinopodium, Benth.
Hedeoma pulegioides, Pers.
Collinsonia Canadensis, L.
Salvia lyrata, L.
officinalis, L.
Monarda didyma, L.
fistulosa, L.
Nepeta Cataria, L.
Glechoma, Benth.
Brunella vulgaris, L.
Scutellaria galericulata, L.
lateriflora, L.
Marrubium vulgare, L.
Galeopsis Tetrahit, L.
Ladanum, L.
Stachys palustris, L. var. aspera, Mx.
hyssopifolia, Mx.
Leonurus Cardiaca, L.
Lamium amplexicaule, L.

Borraginaceæ.

Echium vulgare, L.
Symphytum officinale, L.
Lithospermum arvense, L.
Mertensia Virginica, D. C.
Myosotis palustris, With.
Cynoglossum officinale, L.
Morisoni, D. C.

Hydrophyllaceæ.

Hydrophyllum Virginicum, L.

Polemoniaceæ.

Polemonium cæruleum.
Phlox paniculata, L.
maculata, L.

Convolvulaceæ.

Convolvulus arvensis, L.
Calystegia sepium, R. Br.
Cuscuta Gronovii, Willd.

Solanaceæ.

Solanum Dulcamara, L.
tuberosum, L.
Hyoscyamus niger, L.
Datura Stramonium, L.
Nicotiana Tabacum, L.
Atropa Belladonna, L.
Lycium Barbarum, L.

Gentianaceæ.

Sabbatia chloroides, Pursh.
Gentiana crinita, Frœl.
Andrewsii, Griseb.
Bartonia tenella, Muhl.
Menyanthes trifoliata, L.
Limnanthemum lacunosum, Griseb.

Apocynaceæ.

Apocynum cannabinum, L.

Asclepiadaceæ.

Asclepias purpurascens, L.
variegata, L.
quadrifolia, Jacq.
incarnata, L.
tuberosa, L.

Oleaceæ.

Syringa vulgaris.
Persica.
Ligustrum vulgare, L.
Chionanthus Virginica, L.

Phytolaccaceæ.

Phytolacca decandra, L.

Amarantaceæ.

Amarantus albus, L.

Polygonaceæ.

Polygonum orientale, L.
amphibium, L.
Persicaria, L.
Hydropiper, L.
acre, H. B. K.
hydropiperoides, Mx.
tenue, Mx.
arifolium, L.
sagittatum, L.
Convolvulus, L.
dumetorum, L.
Fagopyrum esculentum, Mœnch.
Rumex crispus, L.
sanguineus, L.
Acetosella, L.

Lauraceæ.

Sassafras officinale, Nees.
Benzoin odoriferum, Nees.

Santalaceæ.
Comandra umbellata, Nutt.

Callitrichaceæ
Callitriche verna, L.

Euphorbiaceæ.
Euphorbia polygonifolia, L.
maculata, L.

Urticaceæ.
Ulmus Americana, L.
Morus rubra, L.
Laportea Canadensis, Gaudich.
Bœhmeria cylindrica, Willd.
Cannabis sativa, L.

Juglandaceæ.
Carya alba, Nutt.
glabra, Torr.

Cupuliferæ.
Quercus Prinus, L. var. discolor, Mx.
Carpinus Americana, Mx.
Ostrya Virginica, Willd.

Myricaceæ.
Comptonia asplenifolia, Ait.

Betulaceæ.
Betula lenta, L.

Coniferæ.
Pinus resinosa, Ait.
Juniperus communis, L.
Virginiana, L.

Araceæ.
Arisæma triphyllum, Torr.
Orontium aquaticum, L.
Acorus Calamus, L.

Typhaceæ.
Typha latifolia, L.
angustifolia, L.
Sparganium simplex, Hudson.

Lemnaceæ.
Lemna minor, L.
polyrrhiza, L.

Naiadaceæ.
Potamogeton pauciflorus, Pursh.
lucens, L.
natans, L.

Alismaceæ.
Alisma Plantago, L.
Sagittaria variabilis, Englm.

Orchidaceæ.
Gymnadenia tridentata, Lindl.
Platanthera dilatata, Lindl.
flava, Gray.
blephariglottis, Lindl.
lacera, Gray.
psycodes, Gray.
Goodyera pubescens, R. Br.
Spiranthes gracilis, Big.
cernua, Richard.
Arethusa bulbosa, L.
Pogonia ophioglossoides, Nutt.
Calopogon pulchellus, R. Br.
Cypripedium acaule, Ait.

Amaryllidaceæ.
Hypoxys erecta, L.

Hæmodoraceæ.
Aletris farinosa, L.

Iridaceæ.
Iris versicolor, L.
Sisyrinchium Bermudiana, L.

Smilaceæ.
Smilax herbacea, L.
Trillium cernuum, L.
erectum, L.
Medeola Virginica, L.

Liliaceæ.
Asparagus officinalis, L.
Polygonatum biflorum, Ell.
Smilacina racemosa, Desf.
bifolia, Ker.
Clintonia borealis, Raf.
Ornithogalum umbellatum, L.
Lilium Philadelphicum, L.
Lilium Canadense, L.
Erythronium Americanum, Sm.

Melanthaceæ.
Uvularia perfoliata, L.
sessilifolia, L.
Streptopus roseus, Mx.
Veratrum viride, Ait.
Amianthemum muscætoxicum, Gray.

Juncaceæ.

Luzula campestris, D. C.
Juncus effusus, L.
filiformis, L.
scirpoides, Lam.
paradoxus, E. Meyer.
acuminatus, Mx.
articulatus, L.
militaris, Big.
Conradi, Tuck.
marginatus, Rostk.
tenuis, Willd.
Grœnii, Oakes & Tuck.
bulbosus, L.
bufonius, L.

Pontederiaceæ.

Pontederia cordata, L.

Xyridaceæ.

Xyris bulbosa, Kunth.

Eriocaulonaceæ.

Eriocaulon septangulare, With.

Cyperaceæ.

Cyperus diandrus, Torr.
Nuttallii, Torr.
strigosus, L.
dentatus, Torr.
filiculmis, Vahl.
Dulichium spathaceum, Pers.
Eleocharis obtusa, Schultes.
olivacea, Torr.
palustris, R. Br.
tenuis, Schultes.
acicularis, R. Br.
Scirpus subterminalis, Torr.
pungens, Vahl.
lacustris, L.
debilis, Pursh.
Scirpus maritimus, L.
sylvaticus, L.
Eriophorum, Mx.
Eriophorum Virginicum, L.
polystachyon, L.
Fimbristylis autumnalis, Rœm. & Schult.
capillaris, Gray.
Rhynchospora alba, Vahl.
glomerata, Vahl.
Carex exilis, Dew.
polytrichoides, Muhl.
vulpinoidea, Mx.
stipata, Muhl.
sparganioides, Muhl.
cephalophora, Muhl.
canescens, L.
stellulata, Good.
scoparia, Schk.
lagopodioides, Schk.
festucacea, Schk.
straminea, Schk.
vulgaris, Fries.
stricta, Lam.
crinita, Lam.
panicea, L.
pallescens, L.
conoidea, Schk.
gracillima, Schk.
virescens, Muhl.
plantaginea, Lam.
laxiflora, Lam.
Novæ-Angliæ, Schw.
Pennsylvanica, Lam.
scabrata, Schw.
debilis, Mx.
flava, L.
Œderi, Ehrh.
filiformis, L.
lanuginosa, Mx.
vestita, Willd.
lacustris, Willd.
comosa, Boott.
tentacula, Muhl.
intumescens, Rudge.
folliculata, L.
lupulina, Muhl.
vesicaria, L.
ampullacea, Good.
bullata, Schk.
oligosperma, Mx.

Graminæ.

Leersia oryzoides, Swartz.
Zizania aquatica, L.
Alopecurus pratensis, L.

Alopecurus geniculatus, L.
Phleum pratense, L.
Vilfa vaginæflora, Torr.
Sporobolus serotinus, Gray.
Agrostis scabra, Willd.
vulgaris, With.
alba, L.
Cinna arundinacea, L.
Muhlenbergia glomerata, Trin.
Brachyelytrum aristatum, Beau.
Calamagrostis Canadensis, Beau.
arenaria, Roth.
Aristida dichotoma, Mx.
Spartina cynosuroides, Willd.
juncea, Willd.
stricta, Roth. var. glabra, Muhl.
Eleusine Indica, Gart.
Dactylis glomerata, L.
Eatonia obtusata, Gray.
Glyceria Canadensis, Trin.
obtusa, Trin.
elongata, Trin.
nervata, Trin.
pallida, Trin.
aquatica, Sm.
fluitans, R. Br.
acutiflora, Torr.
maritima, Wahl.
Brizopyrum spicatum, Hook.
Poa annua, L.
serotina, Ehr.
trivialis, L.
pratensis, L.
compressa, L.
Eragrostis pectinacea, Gray.
Briza media, L.
Festuca tenella, Willd.
ovina, var. duriuscula.
elatior, L.
nutans, Willd.
Bromus secalinus, L.
mollis, L.
ciliatus, L.
Phragmites communis, Trin.
Lolium perenne, L.
Triticum repens, L.
Hordeum jubatum, L.
Secale cereale, L.
Elymus Virginicus, L.
Canadensis, L.
Gymnostichum Hystrix, Schreb.
Aira flexuosa, L.
atropurpurea, Wahl.
Danthonia spicata, Beau.
Avena sativa, L.
Arrhenatherum avenaceum, Beau.
Holcus lanatus, L.
Hierochloa borealis, Roem. & Schult.
Anthoxanthum odoratum, L.
Phalaris arundinacea, L.
Paspalum setaceum, Mx.
Panicum sanguinale, L.
anceps, Mx.
agrostoides, Spreng.
capillare, L.
virgatum, L.
latifolium, L.
clandestinum, L.
dichotomum, L.
Crus-Galli, L.
Setaria glauca, Beau.
viridis, Beau.
Italica, Kunth.
Andropogon furcatus, Muhl.
scoparius, Mx.
Sorghum nutans, Gray.
vulgare, Pers.
Zea Mays.

Equisetaceæ.

Equisetum sylvaticum, L.
limosum, L.

Filices.

Polypodium vulgare, L.
Pteris aquilina, L.
Adiantum pedatum, L.
Asplenium ebeneum, Ait.
Filix. fœmina, R. Br.
Aspidium Phelypteris, Swartz.
Onoclea sensibilis, L.
Osmunda regalis, L.
Claytoniana, L.

Lycopodiaceæ.

Lycopodium lucidulum, Mx.
dendroidum, Mx.

INVENTORY

Of Personal Property on the State Farm, Westborough, Dec. 1, 1858.

6 Oxen,		$560 00
17 Cows,		850 00
2 Hereford Cows,		300 00
1 Hereford Bull,		200 00
1 Hereford two yearling Heifer,		100 00
1 Hereford Bull Calf,		75 00
1 Jersey Cow, (diseased in udder,)		40 00
1 Jersey Heifer,		100 00
1 Devon Cow,		100 00
1 Devon Heifer two years old,		50 00
1 Devon Heifer one year old,		33 00
1 Devon Heifer Calf,		20 00
1 Durham Cow,		200 00
1 Durham Bull Calf,		100 00
1 Durham Heifer Calf,		50 00
1 Grade Devon Heifer,		25 00
1 Grade Jersey Heifer,		25 00
1 Grade Ayrshire Calf,		20 00
1 Ayrshire Bull,		75 00
5 Horses,		500 00
2 Fat Hogs,	$30 00	
4 Breeding Sows,	60 00	
1 Boar,	25 00	
52 Shotes,	300 00	
14 Sucking Pigs,	25 00	— 440 00
81 tons English Hay,		1,215 00
4 tons Rowen,		60 00
36 tons Meadow Hay,		250 00
2 tons Millet,		24 00
6 tons Straw Hay,		48 00
15 tons Corn Stover,		120 00
536 bushels Shelled Indian Corn,		536 00
590 bushels Ruta-Bagas,		118 00
1520 bushels Turnips,		304 00
1076 bushels Carrots,		269 00
117 bushels Seed Potatoes,		58 50
50 bushels Oats,		27 50
2 bushels Buckwheat,		1 50
30 bushels Wheat,		45 00
8 bushels Barley,		8 00
3 bushels Rye,		3 00
670 bushels Beets,		167 50
490 bushels Parsnips, by estimation,		100 00
4 Hay Cutters,		40 00
1 Feed Trough,		4 00
10 Hay Forks,		4 00
30 Hay Rakes,		5 00
26 Manure Forks,		32 50
100 Shovels,		50 00
22 Spades,		18 00
Amount carried up,		$7,333 50

Amount brought up,		$7,333 50
61 Picks,		61 00
2 Manure Hooks,		1 00
15 Iron Bars,		15 00
3 Stone Hammers,		5 00
1 Ox Wagon,		35 00
1 Two-Horse Wagon,		20 00
1 One-Horse Wagon,		15 00
1 Lumber Wagon,		50 00
1 Job Wagon,		60 00
3 Ox Carts,		60 00
4 Horse Carts,		140 00
3 Stone Drags,		6 00
10 Ploughs,		90 00
4 Harrows,		20 00
1 Cultivator,		3 00
2 Horse Hoes,		12 00
2 Hand Cultivators,		2 00
2 Horse Harrows,		4 00
5 Ox Yokes,		12 00
9 Draft Chains,		12 00
2 Derric Chains,		10 00
6 Stake Shains,		4 00
1 Ox Sled,		4 00
1 Horse Sled,		5 00
1 Two-Horse Double-runner Sled,		10 00
1 Pleasure Sleigh,		10 00
1 lot of old Harnesses,		40 00
1 Harness,		10 00
4 Horse-Cart Harnesses,		32 00
4 Trace Chains,		3 00
Stable Furniture,		10 00
Furniture in Scale Room,		5 00
1 Iron Roller,		20 00
Fanning Mill and Corn Sheller,		12 00
1 Stone Elevator,		165 00
2 bushels Seed Corn,		4 00
1 bushel Seed Beans,		2 00
1 Seed Sower,		3 00
1 Platform Scale,		7 00
20 Strawberry Boxes,		1 00
60 Hand Hoes,		20 00
10 Hand Drills,		6 00
2 Hand Hammers,		3 00
20 Wheelbarrows,		40 00
1 Beetle, with Wedges,		2 00
2 Grindstones,		10 00
4 Water Cans,		2 00
6 Bog Hoes,		5 00
8 Axes,		5 00
Amount carried forward,		$8,411 50

	Amount brought forward,	$8,411 50
6	Wood Saws,	5 00
6	Ice Hooks,	2 00
1	pair Ice Tongs,	2 00
2	Cross-cut Saws,	6 00
	Carpenters' Tools,	18 00
6	Scythes and Snaths,	3 00
20	Baskets,	6 00
18	Milk Cans,	10 00
500	feet Pine Lumber,	7 00
4	Buckets,	1 00
3	Milk Pails,	60
1	Surveyor's Chain,	2 00
1	Ox Shovel,	6 00
1	Spirit Level,	2 00
1	Swill Cart,	40 00
1	Refrigerator,	10 00
2	Derricks,	75 00
	Household Furniture,	100 00
1	Garden Rule,	75
15	Corn Cutters,	2 00
	Amount carried up,	$8,709 85

	Amount brought up,	$8,709 85
1	Root Cutter,	10 00
1	Saddle,	4 00
8	Iron-Toothed Rakes,	3 00
3	Wheel Hoes,	3 00
1	Wheel Stone Drag,	8 00
6	Stone Boat Plank,	5 00
	Plank for six Sled Runners,	6 00
	Furniture in Blacksmith's Shop,	30 00
	Gate Hangings,	5 00
20	Weeding Trowels,	1 20
1	Corn Fork,	1 50
	Carboy Sulphuric Acid,	6 51
1	Pruning Saw and Chisel,	1 00
8	Corn Bags,	1 00
4	Sack Bags,	50
15	Acres of Winter Rye on the Ground,	75 00
		$8,870 56
	Cash on hand December 1, 1858,	373 48
	Total,	$9,244 04

SCHEDULE

Of Stock, Tools and Implements, on the State Farm at Westborough, with their estimated value, together with the estimated value of the real estate, April 1, 1859.

4	Oxen,	$340 00	
21	Cows,	1,260 00	
1	Hereford Bull, three years old,	300 00	
1	Hereford Bull, one year old,	100 00	
1	Durham Cow, four years old,	225 00	
1	Durham Bull, one year old,	115 00	
1	Grade Jersey Heifer, two years old,	35 00	
1	Grade Ayrshire Heifer, one year old,	25 00	
1	Ayrshire Bull,	75 00	
4	old breeding Sows, 13 Pigs,	125 00	
4	young breeding Sows and Pigs,	60 00	
36	Shotes,	324 00	
5	Pigs,	25 00	
1	Boar,	25 00	
29	tons English Hay,	435 00	
5	tons second quality English Hay,	50 00	
10	tons Meadow Hay,	80 00	
4	tons Bedding Hay,	16 00	
2	tons Rye Straw,	18 00	
150	bushels Indian Corn,	150 00	
250	bushels Ruta-Bagas,	62 50	
200	bushels Carrots,	50 00	
100	bushels Beets,	25 00	
1	acre Parsnips,	25 00	
5	Horses,	475 00	
90	bushels Seed Potatoes,	45 00	
27	bushels Oats,	17 00	
8	bushels Barley,	8 00	
4	Hay Cutters,	40 00	
1	Feed Trough,	4 00	
12	Hay Forks,	5 00	
24	Hay Rakes,	3 00	
26	Manure Forks,	24 00	
112	Shovels,	47 00	
20	Spades,	17 00	
62	Picks,	62 00	
2	Manure Hooks,	1 00	
14	Iron Bars,	14 00	
3	Stone Hammers,	10 00	
1	Ox Wagon,	50 00	
1	Two-Horse Wagon,	25 00	
1	One-Horse Wagon,	10 00	
1	Lumber Wagon,	50 00	
1	Job Wagon,	50 00	
3	Ox Carts,	155 00	
4	Horse Carts,	160 00	
3	Stone Drags,	6 00	
12	Ploughs,	75 00	
5	Harrows,	25 00	
1	Cultivator,	$2 00	
2	Horse Hoes,	12 00	
2	Hand Cultivators,	2 00	
1	Hand Harrow,	2 00	
6	Ox Yokes,	15 00	
10	Chains,	12 00	
2	Derric Chains,	10 00	
6	Stake Chains,	3 00	
1	Ox Sled,	5 00	
1	Horse Sled,	5 00	
1	Double-runner Sled,	11 00	
1	Sleigh,	8 00	
1	Pung Sleigh,	22 00	
	Lot of old Harness,	40 00	
1	Harness,	10 00	
4	Horse Cart Harnesses,	32 00	
1	Pair Plough Harnesses,	6 00	
	Stable and Scale-room Furniture,	15 00	
1	Iron Roller,	20 00	
	Fanning Mill and Corn Sheller,	12 00	
	Stone Elevator,	165 00	
2	bushels Seed Corn,	3 00	
1	bushel Seed Beans,	1 50	
1	Seed Sower, one Platform Scale,	10 00	
20	Strawberry boxes,	1 00	
65	Hand Hoes,	20 00	
10	Hand Drills,	6 00	
2	Hand Hammers,	2 00	
20	Wheelbarrows,	40 00	
3	Iron Wedges,	1 40	
2	Grindstones,	10 00	
4	Water Cans,	2 00	
6	Bog Hoes,	6 00	
8	Axes,	5 00	
6	Wood Saws,	5 00	
6	Ice Hooks,	2 00	
1	pair Ice Tongs,	2 00	
2	Cross-cut Saws,	6 00	
	Carpenter's Tools,	18 00	
6	Scythe Snaths,	3 00	
22	Baskets,	6 00	
18	Milk Cans,	18 00	
500	feet Lumber,	14 00	
4	Wooden Buckets,	1 00	
3	Milk Pails,	1 00	
1	Surveyor's Chain,	2 00	
1	Ox Shovel,	6 00	
1	Spirit Level,	2 00	
1	Refrigerator,	5 00	

1 Swill Cart,	$40 00
2 Derrics,	75 00
House Furniture,	100 00
1 Garden Reel,	75
Corn Cutters,	2 00
1 Root Cutter,	10 00
1 Saddle,	2 00
8 Iron Rakes,	2 50
3 Wheel Hoes,	2 75
1 Wheel Stone Drag,	12 00
6 Stone Drag Planks,	6 00
4 Sled Runners,	5 00
1 Sled-neap and beams,	4 00
Furniture Blacksmith's Shop,	20 00
Gate Hangings,	3 50
16 Weeding Trowels,	1 28
1 Corn Fork,	1 50
1 Carboy Sulphuric Acid,	6 00
1 Pruning Saw, with Chisel,	1 00
10 Corn Bags,	1 00
4 Sacks,	50
15 Acres Winter Rye on the ground,	75 00
4 bushels Grass Seed, mixed,	16 00
18 pounds Powder,	$3 60
4 Ladders,	5 00
1 Grain Cradle,	2 00
2 Flails,	1 00
2 Eveners, with Whiffletrees,	5 00
2 Whiffletree Chains,	1 50
Lot Hotbed Mats,	1 00
4 Tool boxes,	2 00
100 pounds Guano,	3 00
6 Brooms,	1 00
2 Gate Posts,	14 00
	$6,359 28
Cash and due on account April 1,	826 08
	$7,185 36

REAL ESTATE.

285 acres land,	$9,000 00
Farm Barn,	1,500 00
Hog and Slaughter-house,	1,900 00
Granary and Tool-house,	900 00
2 Dwellings,	1,800 00

State Board of Agriculture *in account with the* Commonwealth of Massachusetts.

1859.		Dr.	Cr.
April 1.	To Inventory of personal property, December 1, 1858,	$8,885 26	
	Cash on hand Dec. 1, 1858,	260 73	
	Cash received of sundry persons from December 1, 1858 to April 1, 1859,	352 97	
	By Inventory of personal property, April 1, 1859,		$6,259 28
	Paid out for seeds,		37 27
	milling and grain,		57 45
	out for cows,		195 00
	farm implements,		105 31
	labor,		389 37
	contingencies,		100 75
	board of men,		96 00
	By produce and labor furnished Reform School,		847 97
	Paid Institution boys' labor,		129 00
	swill,		116 68
	for fertilizers for farm,		12 41
	cash to Treasurer of Trustees of Reform School,		226 49
	Amount paid over to Trustees being balance in cash on hand April 1, 1859,		826 08
		$9,499 06	$9,499 06

I have examined the foregoing account, including the cash account of the Treasurer, and find the same to be correctly cast and properly vouched.

JOHN BROOKS.

Boston, April 1, 1859

RETURNS OF AGRICULTURAL SOCIETIES FOR 1859.

FINANCES.

SOCIETIES.	Amount received from the Commonwealth.	Income of the permanent fund.	New members and donations.	All other sources.	Receipts for the year.	Premiums offered.	Premiums and gratuities paid.	Current expenses for the year.	Disbursement for the year.	Indebtedness.	Value of real estate.	Value of personal property.	Permanent fund.
Massachusetts, . .	$800 00	$2,372 18	–	$436 60	$3,118 78	$1,650 00	$205 00	$2,303 91	$2,508 91	–	–	$35,101 76	$35,101 76
Essex, ...	600 00	551 48	213 00	1,319 91	2,684 39	1,655 00	1,134 72	2,096 52	3,231 24	–	$6,000 00	1,900 00	9,004 48
Mid Essex, ...	600 00	80 00	115 00	447 00	1,251 00	728 00	632 37	356 19	988 56	–	3,000 00	2,052 00	5,050 00
Mid Essex South, .	600 00	24 80	68 00	561 92	1,257 72	1,157 50	555 15	449 88	1,220 25	$3,300 00	7,350 00	900 00	8,850 00
Mid Essex North, .	600 00	79 50	60 00	194 57	934 07	714 00	385 12	428 71	895 50	257 47	3,001 93	2,000 00	5,001 93
Worcester, ...	600 00	352 00	110 00	1,440 88	3,281 63	559 00	455 50	1,633 76	2,510 67	–	20,000 00	6,000 00	26,000 00
Worcester West, .	600 00	168 60	42 00	181 75	992 35	740 00	602 93	175 62	778 60	–	–	3,318 60	3,318 60
Worcester North, .	600 00	223 97	60 00	451 40	1,385 37	884 75	618 83	317 12	980 95	–	–	4,100 00	4,100 00
Worcester South, .	400 00	243 11	659 15	64 00	1,366 26	459 00	316 95	198 21	2,842 13	..	2,300 00	534 15	2,834 15
Hampshire, Franklin and Hampden.	600 00	240 00	61 00	639 98	1,540 98	831 75	581 30	677 95	1,758 31	257 33	4,200 00	100 00	4,300 00
Hampshire, . . .	600 00	177 50	32 75	118 00	928 25	497 00	228 17	454 24	682 28	167 84*	3,000 00	379 24	3,050 00
Highland, ...	382 49	10 02	2,588 85	231 83	2,714 19	300 00	240 00	1,561 77	1,761 77	750 00	1,925 00	1,429 27	2,304 27
Hampden, ...	600 00	490 19	345 00	1,337 40	2,772 59	1,320 00	807 81	1,672 22	2,968 27	12,984 56	31,742 14	1,000 00	32,742 14
Hampden East, . .	595 00	101 36	4 00	87 21	787 57	692 00	423 72	125 69	552 41		–	125 00	3,600 00

Franklin,	600 00	180 00	20 00	314 00	1,124 00	689 50	512 00	520 00	1,032 00	–	–	150 00	3,000 00
Berkshire,	650 00	400 00	105 40	1,538 98	2,644 38	1,199 00	1,137 50	884 23	2,487 42	–	10,000 00	100	6,000 00
Housatonic,	600 00	592 20	31 00	1,205 20	2,428 79	813 00	796 00	623 73	2,419 57	5,437 81	8,669 00	150 00	8,822 00
Norfolk,	600 00	–	71 50	1,052 77	1,724 27	1,231 75	593 50	1,045 75	2,661 52	4,800 00	10,114 00	–	10,114 00
Bristol,	600 00	279 95	75 00	725 18	1,680 13	1,368 00	833 25	1,886 46	2,722 71	–	–	4,740 00	4,740 00
Plymouth,	600 00	780 30	318 00	2,183 75	4,885 05	1,490 00	1,450 30	976 21	4,834 53	3,145 78	17,000 00	1,000 00	18,000 00
Barnstable,	600 00	45 40	1,280 00	1,185 39	3,110 79	600 00	268 50	1,145 16	2,013 75	–	5,000 00	1,070 00	6,070 00
Nantucket,	206 00	80 60	476 55	1,148 56	2,171 20	383 00	204 00	411 11	2,009 23	650 00	1,950 00	1,950 00	1,950 00
Vineyard,	–	122 00	222 75	2,418 30	2,763 05	419 50	28 40	65 93	2,613 20	2,100 00	2,518 84	2,183 18	4,552 17
Totals,	$12,954 40	$7,583 84	$6,128 95	$20,240 27	$46,407 58	$21,208 75	$18,520 13	$18,061 42	$47,135 94	$33,859 79	$131,851 91	$93,011 20	$207,985 15

* Unpaid premiums.

PERMANENT FUND—HOW INVESTED.

MASSACHUSETTS.—In bank stocks, Shattuck legacy, policies in Mass. Life Office.

ESSEX.—In bank stocks, notes, railroad bonds.

MIDDLESEX.—In real estate, mortgages, bank and railroad stock and notes.

MIDDLESEX SOUTH.—In real estate, $7,350; pens, &c., $900; notes, $600.

MIDDLESEX NORTH.—In real estate and bills receivable.

WORCESTER.—In bank stock.

WORCESTER WEST.—In promissory notes and cattle pens.

WORCESTER NORTH.—In bank stock, notes of hand, cattle pens, &c.

WORCESTER SOUTH.—In agricultural hall $2,340; cattle pens, store house and fixtures, $255; cash on loan with security, $279.15.

HAMPSHIRE, FRANKLIN AND HAMPDEN.—In notes on real estate securities.

HAMPSHIRE.—In loans on real estate, $2,550; life members' notes, $207.62.

HIGHLAND.—In real estate, office and hall, 8 acres of land, fence, track, $1,925; personal horse stalls, pens, posts, rings, and cash on hand, $578.27; notes of life members, bearing annual interest, $551.

HAMPDEN.—In land, furniture, buildings, implements, tools, and notes.

HAMPDEN EAST.—In notes bearing interest.

FRANKLIN.—In notes and mortgages.

BERKSHIRE.—In notes and land owned by the society.

HOUSATONIC.—In real estate and notes.

NORFOLK.—In real estate occupied by the society.

BRISTOL.—In bank stock.

PLYMOUTH.—In 43 acres of land and improvements, costing about $8,000; buildings thereon, $9,000; cattle pens, furniture and appurtenances, $1,000.

BARNSTABLE.—In notes bearing interest, land, hall and cattle pens.

NANTUCKET.—In individual notes and special deposit in bank and real estate, viz., society's grounds.

VINEYARD.—In 2½ acres land costing $250; agricultural hall, costing $2,268.84, and 117 notes of members bearing annual interest, $2,033.33.

ANALYSIS OF PREMIUMS AND GRATUITIES AWARDED.

FOR FARMS, FARM IMPROVEMENTS, MANURES, &c.

SOCIETIES.	For management of farms.	For draining.	For subsoiling.	For ploughing at the Exhibition.	For reclaiming swamp land.	For experiments with manures.	For spading.	For ornamental trees.	For reclaiming old pastures.	For orchards of all kinds.	For Cranberries.	Total am't offered for farm improvements.	Am't awarded for farm improvements.	Am't paid out for farm improvements.
Massachusetts,	–	–	–	–	–	–	–	–	–	–	–	$500 00	–	–
Essex,	–	$30 00	–	$88 00	–	–	–	–	–	–	–	435 00	$134 00	$219 00
Middlesex,	–	–	–	60 00	–	–	–	–	–	–	–	60 00	60 00	60 00
Middlesex South,	–	–	–	61 00	$18 00	–	–	–	–	$28 00	–	203 00	58 00	58 00
Middlesex North,	–	–	–	47 00	–	–	–	–	–	–	–	40 00	47 00	21 00
Worcester,	–	–	–	40 00	10 00	–	–	–	–	–	–	32 00	10 00	–
Worcester West,	$50 00	–	–	23 00	–	$10 00	–	–	–	–	–	108 00	83 00	83 00
Worcester North,	15 00	–	–	–	73 00	–	–	–	–	25 00	–	154 00	118 00	103 00
Worcester South,	–	–	–	29 00	–	–	–	–	–	–	–	–	29 00	–
Hampshire, Franklin & Hampden,	–	–	–	–	–	10 00	–	–	–	–	–	35 00	10 00	*10 00
Hampshire,	–	3 00	–	15 00	5 00	3 00	–	–	–	–	–	120 00	26 00	13 00
Highland,	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Hampden,	–	–	–	33 00	–	–	–	–	$6 00	14 00	$2 00	264 00	22 00	22 00
Hampden East,	–	–	–	10 00	–	–	–	–	–	–	1 25	89 25	20 25	20 25
Franklin,	–	–	–	–	–	–	–	–	–	–	–	71 00	–	–
Berkshire,	–	–	–	48 00	10 00	–	–	$9 00	–	18 00	–	86 00	85 00	85 00
Housatonic,	–	30 00	–	42 00	–	–	–	–	–	72 00	–	102 00	144 00	–
Norfolk,	–	–	–	53 00	–	–	$15 00	–	–	–	15 00	419 00	83 00	51 00
Bristol,	–	–	–	61 00	–	10 00	–	10 00	–	45 00	5 00	356 00	151 00	151 00
Plymouth,	–	–	–	54 00	–	–	10 75	–	–	14 00	–	–	78 75	–
Barnstable,	–	–	–	15 00	–	10 00	–	–	10 00	7 00	4 00	84 00	46 00	35 00
Nantucket,	–	–	–	9 00	–	–	–	–	–	–	5 00	24 00	14 00	14 00
Vineyard,	–	–	–	12 00	–	13 00	–	–	–	–	3 00	149 59	31 00	–
Totals,	$65 00	$63 00	–	$709 00	$121 00	$54 00	$25 75	$19 00	$16 00	$223 00	$35 25	$3,193 75	$1,150 00	$945 25

* To November 30.

SOCIETIES.	Bulls.	Milch Cows.	Heifers.	Calves.	Working Oxen.	Steers.	Fat Cattle.	Horses.	Sheep.	Swine.	Poultry.	Other Stock.	Amount offered for live stock.	Am't'e awarded for live stock.
Massachusetts,	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Essex,	$65 00	$11 00	$28 00	$8 00	$28 00	$14 00	$25 00	$95 00	$15 00	$21 00	$19 25	–	$189 00	$328 25
Middlesex,	46 00	43 00	23 00	18 00	24 00	7 00	8 00	93 00	–	32 00	20 00	–	380 00	317 00
Middlesex South,	34 00	21 00	33 00	11 00	21 00	10 00	12 00	125 00	–	45 00	20 00	–	327 00	347 00
Middlesex North,	27 00	12 00	31 00	–	22 00	27 00	30 00	55 00	14 00	34 00	26 00	$15 00	357 00	278 00
Worcester,	12 00	11 00	27 00	–	31 00	37 00	23 00	146 00	14 00	25 00	11 00	–	406 00	337 00
Worcester West,	27 00	46 00	14 00	18 00	30 00	32 00	37 00	49 00	9 00	20 00	11 00	23 50	383 00	325 00
Worcester North,	28 00	27 00	43 00	26 00	20 00	24 50	27 00	63 50	9 00	28 00	10 75	–	358 50	306 75
Worcester South,	27 00	15 00	14 00	3 00	29 00	22 00	14 00	24 00	11 00	24 00	5 50	7 50	208 00	193 00
Hampshire, Franklin & Hampden,	53 00	28 00	33 00	6 00	12 00	10 00	70 00	145 00	18 00	25 00	–	89 00	589 00	527 00
Hampshire,	14 00	10 25	6 50	8 00	27 25	15 75	10 00	65 05	8 00	14 50	4 68	–	201 00	169 17
Highland,	21 00	21 00	14 00	4 25	16 00	13 50	12 00	54 00	18 00	4 50	–	29 00	223 00	207 25
Hampden,	43 00	15 00	18 00	9 00	53 00	34 00	63 00	123 00	28 00	22 00	7 00	28 00	542 50	443 00
Hampden East,	15 00	19 00	10 00	14 00	29 00	15 00	18 00	78 00	13 00	23 00	10 00	40 00	328 50	284 00
Franklin,	26 00	32 00	16 00	13 00	29 00	58 00	24 00	76 00	25 00	27 50	6 50	–	416 50	333 00
Berkshire,	36 00	75 00	40 00	12 00	45 00	40 00	11 00	190 00	82 00	33 00	20 00	–	614 00	584 00
Housatonic,	42 00	40 60	20 00	3 00	41 00	31 00	4 00	90 00	55 00	21 00	7 00	32 00	401 00	387 00
Norfolk,	19 00	42 00	35 00	6 00	21 00	11 00	–	152 00	–	32 00	40 00	–	721 00	358 00
Bristol,	45 00	38 00	14 00	6 00	45 00	41 00	35 00	97 00	18 00	15 00	20 50	–	335 00	374 50
Plymouth,	53 00	26 00	35 00	27 00	33 00	40 50	52 00	159 00	22 00	35 00	14 50	–	533 00	474 00
Barnstable,	15 00	15 00	15 00	10 00	14 00	16 00	40 00	27 00	10 00	21 00	17 00	–	220 00	200 00
Nantucket,	8 00	27 00	–	–	7 00	5 00	–	40 00	8 00	4 00	7 00	–	146 00	106 00
Vineyard,	7 75	6 00	3 25	–	9 50	5 50	8 00	14 00	9 75	9 50	6 50	–	146 50	79 75
Totals,	$829 75	$589 25	$468 75	$222 25	$670 75	$518 75	$611 00	$1,954 55	$389 75	$527 00	$284 18	$294 00	$8,370 50	$7,067 67

ANALYSIS OF PREMIUMS AND GRATUITIES AWARDED—Continued.

FOR FARM PRODUCTS.

SOCIETIES.	Indian Corn.	Wheat.	Rye.	Barley.	Oats.	Beans.	Grass Crops.	Grass Seeds.	Potatoes.	Carrots.	Beets.	Parsnips.	English Turnips.	Ruta-Bagas.	Onions.	Other Root Crops.
Massachusetts,	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Essex,	–	$8 00	$8 00	–	–	–	–	–	$8 00	$8 00	–	$8 00	–	–	$8 00	–
Middlesex,	–	–	–	–	–	–	–	–	–	27 75‡	–	–	–	–	–	–
Middlesex South,	–	5 00	–	–	$6 00	$0 50	–	–	2 00	–	–	–	–	–	–	¶$23 50
Middlesex North,	$37 00	14 00	15 00	–	–	–	–	–	–	29 75‡	–	–	–	–	–	–
Worcester,	1 00	5 00	2 00	$0 50	1 00	–	–	–	50	50	$0 50	–	$0 50	–	50	–
Worcester West,	16 00	10 00	–	–	8 00	–	–	–	–	–	–	–	–	–	–	–
Worcester North,	17 25	9 00	5 00	3 50	5 00	–	–	$5 00	11 50	7 00	1 25	25	75	$2 00	1 25	–
Worcester South,	1 50†	5 00	–	–	–	–	–	–	1 00	2 00	–	–	–	1 00	50	1 00
Hampshire, Franklin & Hampden,	–	18 00	8 00	–	–	–	–	–	–	5 00	–	–	–	–	–	–
Hampshire,	1 00	3 50	30	–	50	20	–	–	1 55	3 75	65	–	1 00	–	40	3 40
Highland,	1 00	1 00	–	1 00	1 00	–	–	–	1 00	1 00	–	–	1 00	–	–	1 00
Hampden,	5 00	5 00	–	–	4 00	–	–	–	10 50	10 50	6 00	–	50	50	75	24 00
Hampden East,	9 75	9 50	4 75	–	75	2 50	–	–	2 50	75	75	–	1 50	–	5 75	–
Franklin,*	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Berkshire,	31 00	21 00	21 00	15 00	21 00	5 00	$28 00	3 00	15 00	7 50	7 00	14 50‖	7 00	6 00	1 50	a35 00
Housatonic,	42 00	24 00	14 00	9 00	21 00	8 00	1 50‡	16 00	15 00	14 00	5 00	–	6 00	–	–	–
Norfolk,	13 00	–	–	–	6 00	–	–	–	–	5 00	–	–	–	–	–	25 00
Plymouth,	49 00	–	14 00	14 00	14 00	10 00	–	–	–	8 00	–	–	–	8 00	–	b5 00
Bristol,	–	–	–	–	–	–	–	–	10 00	–	–	–	–	5 00	–	c41 00
Barnstable,	8 00	12 00	6 00	3 00	6 00	2 00	–	–	8 00	6 00	–	–	–	–	4 00	–
Nantucket,	8 00	1 50	–	–	4 00	–	–	–	3 50	–	–	–	5 00	–	1 50	–
Vineyard,	10 00	3 50	–	–	2 00	50	–	–	3 25	4 50	1 50	–	1 75	–	1 25	–
Totals,	$250 50	$155 00	$85 65	$46 00	$140 25	$28 70	$29 50	$24 00	$86 20	$141 00	$22 65	$22 75	$25 00	$22 50	$25 40	$158 90

* Awards not yet made for this year.
† Gratuity.
‡ Seed corn.
§ Miscellaneous.
¶ Other vegetables.
‖ Gardens.
a Specimens at Exhibition, $28.
b Vegetables.
c Squashes.

SOCIETIES.	Sums offered for Grain & Root Crops.	Sums awarded for Grain and Root Crops.	Sums paid for Grain & Root Crops.	Amount awarded for Broomcorn Brush.	For Fruits.	For Flowers.	For other Cultivated Crops.	For Butter.	For Cheese.	For Honey.	For Wheat Bread.	For Rye Bread.	For Corn Bread.	Sums paid out for Farm Products
Massachusetts,	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Essex,	$130 00	$48 00	$48 00	–	$108 00	$36 50	$48 00	$40 00	$18 00	$4 00	$2 00	–	–	$294 00
Middlesex,	–	–	–	–	145 00	–	–	20 00	–	–	14 00	$1 50	$1 50	10 00
Middlesex South,	50 00	17 00	17 00	–	50 50	50	–	10 00	8 00	35	6 50	–	7 00	136 85
Middlesex North,	150 00	95 75	95 25	–	–	–	77 75	14 00	–	–	11 00	4 00	–	202 50
Worcester,	18 00	12 00	12 00	–	–	–	12 00	13 00	20 00	–	–	50	50	–
Worcester West,	58 00	34 00	34 00	–	20 00	50	8 50	8 00	47 00	–	5 00	1 50	1 50	120 00
Worcester North,	93 00	68 75	65 50	–	66 75	6 00	15 87	16 50	4 50	2 00	13 00	50	–	179 62
Worcester South,	25 00	12 00	12 00	–	8 50	1 50	–	9 00	9 00	–	7 00	–	3 00*	74 00
Hampshire, Franklin and Hampden,	94 00	31 00	31 00	–	39 50	8 00	9 50	10 00	9 00	–	12 75	50	–	91 00
Hampshire,	37 50	16 15	6 75	$3 00	13 45	4 25	–	18 25	5 50	3 25	12 50	1 00	5 87	54 50
Highland,	9 00	8 00	8 00	–	2 00	1 25	2 00	6 00	6 00	50	2 50	1 00‡	2 50	17 50
Hampden,	116 00	42 00	38 00	–	38 00	7 00	–	22 00	5 00	1 00	1 50	1 00	1 50	131 50
Hampden East,	85 25	38 50	38 50	–	17 75	3 50	2 50	6 00	6 00	3 00	1 50	1 50	1 50	81 50
Franklin,	80 00	*	*	–	29 75	5 00	6 00	7 00	7 00	1 50	4 75	75	25	*
Berkshire,	214 00	238 50	238 50	–	26 00	9 50	–	21 00	21 00	–	8 00	1 50	1 50	221 00
Housatonic,	210 00	188 50	188 50	–	33 00	6 00	14 00‖	15 00	15 00	3 00	1 50	1 50	1 50	20 50
Norfolk,	160 00	43 00	23 00	–	24 00	18 00	–	25 00	–	–	5 00	5 00	2 00¶	50 00
Plymouth,	249 00	113 00	172 00	–	100 00	–	–	33 00	39 00	–	6 00	–	6 00*	172 00
Bristol,	223 00	55 00	55 00	–	65 25	8 00	–	20 00	11 00	12 00	7 00	–	7 00	138 25
Barnstable,	108 00	55 00	33 00	–	23 00	20 00	26 75	6 00	6 00	–	6 00	6 00	6 00	98 50
Nantucket,	80 00	22 00	22 00	–	23 50	7 00	5 00	9 00	2 00	2 00	–	50	–	187 00
Vineyard,	94 00	31 25	10 00	–	10 00	5 00	–	4 50	2 00	–	–	–	10 00§	11 15
Totals,	$2,315 75	$1,179 40	$1,101 00	$3 00	$824 95	$147 50	$212 87	$339 25	$251 00	$32 60	$92 88	$31 38	$56 88	$2,678 72

* Awards not yet made.
‖ Gingerbread.
† Maple sugar.
¶ Rye and corn bread.
‡ Vegetable gardens
a Wheat and Indian.
§ Rye and Indian.
b Cake and preserves.

MISCELLANEOUS.

SOCIETIES.	Amount awarded for agricultural implements.	Amount offered for raising forest trees.	For other agricultural objects.	For mechanical inventions, domestic manufactures, &c.	Number of persons who received premiums and gratuities.
Massachusetts,	–	$1,000 00	–	–	2
Essex,	$20 00	30 00	$786 25	$117 75	318
Middlesex,	–	–	–	30 62	157
Middlesex South,	11 50	50 00	–	83 65	203
Middlesex North,	–	–	512 50	9 24	212
Worcester,	–	22 00	–	–	–
Worcester West,	12 25	30 00	–	57 73	156
Worcester North,	7 00	50 00	12 00	52 66	179
Worcester South,	2 50	35 00	–	31 95	116
Hampshire, Franklin and Hampden,	13 00	20 00	–	86 00	263
Hampshire,	3 00	10 00	–	31 56	253
Highland,	50	–	–	25 00	128
Hampden,	–	25 00	–	180 00	201
Hampden East,	50	–	–	29 72	121
Franklin,	16 00	10 00	–	43 00	178
Berkshire,	15 00	–	–	132 50	365
Housatonic,	–	–	–	98 00	223
Norfolk,	4 00	30 00	–	51 50	175
Plymouth,	12 00	60 00	–	343 22	518
Bristol,	–	105 00* 20 00†	–	104 50	226
Barnstable,	1 00	8 00	–	77 24	167
Nantucket,	50	8 00* 8 00†	–	24 00	80
Vineyard,	2 00	28 00‡	179 76	25 00	207
Totals,	$123 75	$1,523 00	$1,520 51	$1,651 14	4,478

* Awarded. † Paid out. ‡ Offered; $5 paid out.

Names of the Towns and Cities in which resided the persons when receiving the Premiums and Gratuities awarded by the County Societies, and the several amounts as disbursed.

MASSACHUSETTS.

Concord,	$180 00	Haverhill,	$25 00

ESSEX.

Andover,	$45 50	Manchester,	$3 50
Beverly,	30 25	Marblehead,	62 50
Bradford,	16 00	Newbury,	40 00
Boxford,	31 00	Newburyport,	14 50
Danvers,	144 25	North Andover,	91 00
Essex,	16 50	Middleton,	18 00
Georgetown,	8 00	Rowley,	5 50
Gloucester,	13 50	Salem,	140 00
Groveland,	6 00	South Danvers,	80 25
Hamilton,	3 00	Swampscott,	14 00
Haverhill,	19 00	Topsfield,	25 00
Ipswich,	5 00	Wenham,	11 75
Lawrence,	7 00	West Newbury,	44 00
Lynnfield,	9 00	Total,	$904 00

MIDDLESEX.

Acton,	$15 25	Bedford,	$4 50
Ashby,	3 50	Belmont,	1 00

MIDDLESEX—CONTINUED.

Billerica,	$87 00	Reading,	$85 00
Brighton,	12 00	South Reading,	4 00
Burlington,	1 00	Somerville,	2 00
Cambridge,	27 00	Stow,	8 50
Carlisle,	7 00	Sudbury,	8 00
Chelmsford,	24 00	Tewksbury,	17 00
Concord,	193 12	Waltham,	34 50
Dracut,	16 00	Watertown,	17 00
Framingham,	29 00	Wayland,	49 00
Groton,	8 00	West Cambridge,	20 00
Lexington,	7 25	Westford,	1 00
Lincoln,	27 50	Weston,	17 00
Littleton,	24 25	Wilmington,	17 00
Marlborough,	10 00	Winchester,	4 00
Newton,	2 00	Woburn,	4 00
Pepperell,	5 00	Total,	$632 37

MIDDLESEX SOUTH.

Ashland,	$46 25	Newton,	$8 50
Framingham,	302 43	Sherborn,	15 25
Holliston,	18 50	Southborough,	49 50
Hopkinton,	37 25	Sudbury,	16 50
Marlborough,	30 00	Wayland,	62 25
Natick,	56 00	Total,	$642 43

MIDDLESEX NORTH.

Billerica,	$9 00	Dracut,	$97 25
Chelmsford,	72 00	Dunstable,	58 00

MIDDLESEX NORTH—CONTINUED.

Lowell,	$143 24	Tyngsborough,	35 25
North Reading,	18 00	Westford,	18 75
South Reading,	18 00	Wilmington,	18 00
Tewksbury,	64 25	Total,	$551 74

WORCESTER.

Auburn,	$6 00	Oxford,	$11 00
Barre,	27 00	Princeton,	35 00
Berlin,	4 00	Shrewsbury,	17 00
Bolton,	7 00	Southborough,	16 00
Boylston,	3 00	Sterling,	4 00
Grafton,	18 00	Sutton,	20 50
Holden,	13 00	Uxbridge,	7 00
Leicester,	2 00	Warren,	6 00
Millbury,	20 00	Westborough,	22 00
Milford,	6 00	West Boylston,	11 00
New Braintree,	6 00	Worcester,	168 00
Northborough,	8 00	Total,	$441 50
North Brookfield,	4 00		

WORCESTER WEST.

Barre,	$368 48	Hardwick,	$64 25
Brookfield,	50	Hubbardston,	11 00
Dana,	2 50	Holden,	75
Gardner,	2 00	New Braintree,	30 75

WORCESTER WEST—CONTINUED.

Oakham,	$24 00	Templeton,	$2 75
Petersham,	18 00	West Brookfield,	6 00
Phillipston,	1 00	Total,	$603 48
Princeton,	71 50		

WORCESTER NORTH.

Ashburnham,	$4 50	Princeton,	$184 00
Ashby,	9 25	Shirley,	22 50
Athol,	2 00	Sterling,	19 25
Fitchburg,	296 83	Templeton,	1 00
Gardner,	1 50	Westminster,	12 00
Leominster,	28 25		$613 83
Lunenburg,	32 75		

WORCESTER SOUTH.

Brimfield,	$9 50	Sturbridge,	$169 20
Charlton,	102 25	Warren,	6 25
Dudley,	14 50	Webster,	5 50
Holland,	4 50	West Brookfield,	25
Southbridge,	30 50	Total,	$342 95
Spencer,	50		

HAMPSHIRE, FRANKLIN AND HAMPDEN.

Amherst,	$6 00	Chesterfield,	$4 50
Belchertown,	4 00	Conway,	2 00
Buckland,	1 00	Cummington,	1 00

HAMPSHIRE, FRANKLIN AND HAMPDEN—CONTINUED.

Easthampton,	$69 50	South Hadley,	$50 00
Goshen,	7 50	Southampton,	70 00
Granby,	5 00	Springfield,	9 00
Hadley,	45 00	Sunderland,	20 00
Hatfield,	28 00	Westhampton,	11 00
Huntington,	40 50	Westfield,	105 00
Leverett,	10 00	Whately,	17 50
Northampton,	226 50	Williamsburg,	7 00
Plainfield,	4 00	Worthington,	5 00
Prescott,	3 00	Total,	$780 00
South Deerfield,	28 00		

HAMPSHIRE.

Amherst,	$120 32	Heath,	$5 00
Athol,	1 00	Leverett,	40 70
Barre,	1 75	Northampton,	2 00
Belchertown,	25 18	Palmer,	2 00
Binghampton, N. Y.,	1 00	Pelham,	9 90
Deerfield,	8 00	Prescott,	1 50
Easthampton,	3 00	Shelburne,	3 00
Granby,	3 45	Shutesbury,	20
Greenfield,	2 00	South Hadley,	9 25
Hadley,	40 83	Sunderland,	61 14
Hardwick,	20	Total,	$341 42

HIGHLAND.

Becket,	$47 25	Cummington,	$6 00
Chester,	37 25	Hinsdale,	24 50

HIGHLAND—Continued.

Middlefield,	$114 50	Pittsfield,	$2 00
Montgomery,	1 00	Washington,	5 00
Northampton,	2 00	Worthington,	9 75
Peru,	10 75	Total,	$260 00

HAMPDEN.

Agawam,	$26 00	Springfield,	$261 00
Blandford,	3 25	Southwick,	4 00
Chester,	8 00	West Springfield,	120 00
Chicopee,	72 21	Westfield,	88 50
Holyoke,	36 00	Wilbraham,	130 00
Longmeadow,	52 75	Total,	$807 21
Palmer,	5 50		

HAMPDEN EAST.

Belchertown,	$21 50	Ware,	$10 00
Brimfield,	29 25	Warren,	20 00
Ludlow,	14 75	Wilbraham,	45 75
Monson,	122 75	Total,	$426 72
Palmer,	162 72		

FRANKLIN.

Bernardston,	$27 75	Conway,	$15 25
Buckland,	50	Deerfield,	74 00
Charlemont,	1 00	Erving,	2 00
Coleraine,	16 75	Gill,	3 00

FRANKLIN—Continued.

Greenfield,	$72 00	Orange,	$4 00
Heath,	2 00	Rowe,	2 00
Leverett,	7 00	Shelburne,	238 25
Leyden,	5 25	Sunderland,	12 00
Montague,	13 25	Total,	$508 50
Northfield,	15 75		

BERKSHIRE.

Adams,	$33 00	Peru,	$13 00
Barrington,	20 00	Pittsfield,	335 00
Becket,	22 00	Richmond,	53 00
Cheshire,	35 00	Sheffield,	3 00
Dalton,	36 00	Stockbridge,	115 00
Egremont,	7 00	Tyringham,	19 00
Hancock,	20 00	Washington,	2 00
Hinsdale,	25 00	West Stockbridge,	11 00
Lanesborough,	178 50	Williamstown,	21 50
Lenox,	104 00	Windsor,	16 00
Lee,	67 50	Total,	$1,137 50
Otis,	1 00		

HOUSATONIC.

Alford,	$24 50	Lee,	$34 00
Becket,	2 50	Lenox,	31 00
Cheshire,	5 00	Monterey,	49 50
Egremont,	130 50	North Marlborough,	14 00
Great Barrington,	216 50	Pittsfield,	5 00

HOUSATONIC—CONTINUED.

Richmond,	$19 00	Tyringham,	$23 50
Sandisfield,	7 00	West Stockbridge,	16 00
Sheffield,	127 50	Williamstown,	1 00
Stockbridge,	89 50	Total,	$796 00

NORFOLK.

Bellingham,	$7 00	Needham,	$93 00
Brookline,	15 00	Randolph,	3 00
Canton,	24 00	Roxbury,	49 00
Dedham,	134 50	Sharon,	8 50
Dorchester,	61 50	Stoughton,	16 00
Dover,	31 00	Walpole,	4 50
Foxborough,	3 00	West Roxbury,	70 00
Franklin,	50	Weymouth,	7 00
Medfield,	47 00	Wrentham,	17 00
Medway,	7 00	Tota	$641 00
Milton,	42 50		

PLYMOUTH.

Abington,	$66 00	Hingham,	$4 00
Bridgewater,	379 12	Kingston,	28 00
Carver,	2 00	Lakeville,	11 50
Duxbury,	75	Marshfield,	12 50
East Bridgewater,	161 40	Middleborough,	203 00
Halifax,	40 25	North Bridgewater,	144 87
Hanover,	8 50	Pembroke,	16 00
Hanson,	9 12	Plymouth,	74 75

PLYMOUTH—CONTINUED.

Plympton,	$39 12	Wareham,	$55 00
Rochester,	6 00	West Bridgewater,	125 00
Scituate,	50	Total,	$1,370 38
Taunton,	3 00		

BRISTOL.

Attleborough,	$31 00	New Bedford,	$11 25
Berkley,	15 75	Norton,	42 00
Dighton,	6 75	Raynham,	185 62
Easton,	17 75	Rehoboth,	25 50
Fairhaven,	12 50	Somerset,	17 50
Fall River,	27 62	Taunton,	373 00
Freetown,	2 00	Westport,	36 50
Mansfield,	21 50	Total,	$826 24

BARNSTABLE.

Barnstable,	$400 61	Harwich,	$2 75
Brewster,	9 82	Orleans,	3 75
Chatham,	4 75	Sandwich,	19 00
Dennis,	5 25	Unknown,	10 50
Eastham,	6 00	Yarmouth,	26 12
Falmouth,	5 75	Total,	$494 30

NANTUCKET.

Nantucket,	$11 00

MARTHA'S VINEYARD.

Edgartown,	$43 74	Tisbury,	$105 44
Chilmark,	59 32	Total,	$208 50

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ABSTRACT OF RETURNS

OF THE

AGRICULTURAL SOCIETIES

OF

MASSACHUSETTS,

FOR

1859.

EDITED BY

CHARLES L. FLINT,

SECRETARY OF THE STATE BOARD OF AGRICULTURE.

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1860.

OFFICERS OF THE AGRICULTURAL SOCIETIES, 1860.

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President—DANIEL ADAMS, of Newbury.
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MARTHA'S VINEYARD.

President—LEAVITT THAXTER, of Edgartown.
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[For dates of commencing Fairs in 1860, see p. 310.]

AGRICULTURE OF MASSACHUSETTS.

OBSERVATION AND EXPERIMENT.

From an Address before the Essex Agricultural Society.

BY JAMES J. H. GREGORY.

I have said that the field of observation and experiment was not yet exhausted, that we stand but on the borders of a great land of promise. To every man who believes that for every effect there must be an adequate cause, this is but a self-evident proposition. To illustrate is almost superfluous. For myself I know not as yet how just to balance the manure applied to vines in kind and quality, so as to keep a proper equilibrium between the vine and its fruit, that there may be neither an excess of vine for the fruit, nor an excess of fruit for the vine. I know not how fully to correct the inequality, should the season prove a wet one and over-develop the vine, or, on the other hand a dry one with the opposite effect. I know not as yet how a squash vine or its roots should be pruned to aid in the growth or ripening of its fruit, and how far a wet season may affect any such plan, or a dry season, or the lateness of the season, though I am certain that these have a modifying effect. Squashes in the Marrow and Hubbard varieties usually begin to appear between the seventeenth and twenty-third leaves, very rarely one may be found appearing at the footstalk of the seventh, eighth or ninth leaf; such squashes ripen earlier than others of the field; how far will the seed of such squashes possess the characteristics of the parent? Will seed from the stem end, middle or calyx end, exceed in yielding, or vary the

form of the squashes grown from them? Will a squash yielding a very small number of seed give its like in this respect and *vice versa?* To what degree is it possible to remove by careful culture from any variety any impurities which manifest themselves? Will small, well-ripened seed yield a smaller squash than may be obtained from large, well ripened seed of the same variety? Will the seed from a squash of a superior flavor yield better flavored squashes than those from a squash equally mature but of an inferior quality? Will vines in hills or drills yield the more abundantly, in experiments each vine to be allowed the same area? What is the reason why the grass and, in general, the vegetable growth on some of the islands along our coast is not far from double, acre for acre, that of the same varieties on the adjoining main land, though in each instance the soil is porphyry and greenstone and each are about equally subject to drought?

These questions have a practical bearing on high culture, even if but a negative could be proved of any of them. Every good farmer knows that they may be extended *ad infinitum*. No, the field is not exhausted.

If you go among your brother farmers or pass from agricultural community to agricultural community, you will be struck with the difference in the pecuniary returns which are obtained for the same amount of labor invested. After having made a fair allowance for all local peculiarities, still a marked difference in the result will oftentimes remain unaccounted for. This difference must arise (there is no *chance* in nature) from a knowledge on the part of the more successful of some conditions to success, certain links in the chain of causes which are unknown to the other. It is often true that this knowledge has been stumbled upon, and but little is due to thorough experiment; this is like trusting to finding a dollar as we walk along the highway rather than pursuing a legitimate course which will certainly bring it. A dollar *may* be found on the highway, but meanwhile many dollars could with a certainty be earned.

There is a farmer in the vicinity of Boston who has discovered a way of raising early turnips free from vermin; even his very next neighbor has not learned the process; a simple fence separates widely different results, simply because it separates

different processes of culture. This man has for years had a monopoly of the Boston market and the neighboring towns and cities for a radius of many miles. We, all of us, can readily call to mind those among our farming acquaintances who excel in some particular crop; it may be early potatoes, onions, squashes or cabbages; know that for every effect there is a cause, and if with you, soil, value of manure and market conveniences are about the same, it will very likely pay on your land as well as on his; and while experimenting for this end who can say you may not discover a better way? The miner prospecting for silver sometimes finds gold.

There are whole communities who have a settled belief that they cannot raise crops which are successfully raised in other communities where the natural conditions are the same; oftentimes intelligent experiment only is needed to bridge the chasm. I have in mind a community in which, not many years ago, the field culture of the onion was unknown. The farmers labored under an incubus in the belief that they were not adapted to their locality. By and by a sturdy old fellow came along, and insisted upon it that on such a soil he could and he would raise "hingyuns." The prevalent belief was brought to bear upon him; he was told that the thing was impracticable: but he was bound to try the experiment, and he succeeded. Now that small township devotes in the vicinity of seventy acres annually to the cultivation of this—the best paying cash crop put into its soil. Many of us can call to mind localities where the autumnal Marrow Squash and other varieties have had and are having a hard time of it, simply because a few more observers and experimenters of the right stamp are wanted in those localities. There was a time when the cabbage was never permitted to stray beyond the lowest tillage land; now it displays acres of its blue bloom on the highest corn land; experiment has carried it there.

The specific knowledge yet to be acquired relative to the instincts of the vegetable kingdom, and the connection which exists between the effects we daily witness and the causes which produce them, is, I have reason to believe, but little understood. For every result there *must be* an adequate cause; I would that every farmer realized this. Whether the experiments necessary to determine these causes will pay pecuniarily you must be

your own judges, though to our intellectual and spiritual parts they may yield largely without a dollar going into the pocket. It is true that nature's answers to our interrogatories abound in negatives. Is this the condition of success? Is *this* the condition of success? we ask her, and she returns a dozen negatives to one affirmative, but in the hands of the intelligent cultivator negative truths can be turned to a positive advantage. If a man has not learned the road to take to a destination he desires to reach, yet he is helped towards the right road every time he ascertains that any particular road is a wrong one.

To learn how far the tillers of the soil have advanced in correct and extensive observation and thorough experiment—experiments that shall draw from mother nature all the information she is capable of giving to the questions put, we very naturally turn to our agricultural papers. These are conducted on the excellent idea of having farmers make their own papers, the business of the editor in the agricultural department being a general intelligent supervision, the supplying each number with a well-digested, comprehensive leader, the supplying from the fertility of his own knowledge or from exchanges whatever is wanting in the articles of contributors to cover the whole field of investigation, a discreet use of the veto power and of the pen among the weekly harvest, distributing generously from his own brains among the necessitous, and attending to the thousand other matters which make up the business of the faithful, laborious editor. And here let me urge on my friends not to be contented with subscribing for a single agricultural paper. If a farmer cannot really afford to subscribe for more than one—and he must be a very poor farmer indeed, who is so circumstanced—that ends the matter; but do not reason as so many appear to with whom I have conversed, that you don't need the Ploughman or the Cultivator, because you take the Farmer; or the Farmer or Cultivator, because you take the Ploughman; or the Farmer or Ploughman, because you take the Cultivator. Such farmers will never buy shovels while they have hoes, nor purchase hoes while a rake is in the barn. Of the three papers I have named, neither includes the other; is there any reason, therefore, in saying that *because* you subscribe for one you do not subscribe for others? Each of these papers, as an agricultural paper, fills a sphere of its own.

one being characterized as a conservative paper, another as giving stock particular attention, with a development of the social element, and the third as more general in its range. We have hitherto satisfied ourselves with the mistaken sophistry of placing our agricultural press in the same category with our newspapers. These are, for the most part, but duplicates of each other; but a moment's reflection will convince us that this cannot be true of our agricultural papers. Like subjects are often found in each, it is true, but mostly presented from entirely different stand points. There are farmers who subscribe for twenty or more agricultural papers. I would not advise a number beyond what can be well studied, as well as read, though I believe there are many who subscribe for one who should subscribe for half a dozen. To return to our subject. In compiling from these records of what the farmer is doing in the way of observation and experiment, I find much that is agreeable and profitable, somewhat that is to be regretted. The articles by the practical farmer excel in point, and generally evince that manliness, simplicity and truthfulness of character which belong to the calling. When a man has his heart in his subject, we generally find interesting reading, though he should choose to tell us that a particular species of insect he is describing has six legs, or the particular spider eight: a fact true of all insects and all spiders.

Among other instances of a want of thorough observation on the part of writers, or their ignorance of the recorded observations of others, is one often met with—advising the application of ashes to the roots of vines, to prevent the ascent of a little animal, who, born in the vine, has no connection with the soil until his mischievous course is run. Another is the terminal blossoms, which set no fruit, false blossoms, the belief of the writers being that they are abnormal products, when they are the staminate blossoms, and as necessary for the perfection of the fruit as are the pistilate. Another, and a very striking instance of the want of correct observation on the part of contributors to our papers, is in the treatment advised for fowls. In all the articles that have met my eye relating to the management of fowls, there is a uniform agreement in one error—in advising the feeding of lime in some mineral form, such as pulverized clam shells, oyster shells, burnt bones or

chalk. The necessity for such food is commonly taken for granted, from the fact that lime enters into the composition of the shell of the egg; so does phosphate of lime enter largely into our bones, and from the law of change, which is continually tearing down and rebuilding our framework, this phosphate is constantly needed: yet no man advocates a bone diet. Many of the mollusca have ponderous shells of carbonate of lime to construct, yet it is never conjectured that they digest this in a mineral form. The milk of cows abounds in phosphate of lime, and they must supply the ingredient daily; yet when the animal is healthy, and her pasturage such that the grasses on which she feeds have their proper proportion of phosphoric acid, who ever knew a cow to crave the phosphate in a mineral form? The argument from analogy, therefore, fails. It is true, fowls will eat fragments of bone, clam shells, oyster shells and stone, and it is therefore inferred that the lime must be used in the formation of the shell of the egg; but the male eats this mineral matter as readily, in proportion to the amount of food consumed, as the female. Again, it is urged to give burnt bones; now the lime that enters into the composition of the shell of the egg, is almost wholly carbonate of lime, but the lime in these burnt bones is almost wholly phosphate of lime. Again, in the pebbles there may not be a particle of lime, and yet they will devour these, and for the same reason that the fragments of shell are consumed, viz.: to supply that wonderful internal grinding apparatus of theirs with millstones; and as nature is no bungler in all her works, she has made them good millers by implanting in them a liking for the hardest and most angular fragments. It may here be objected that they readily devour the shells of eggs; but this apparent exception is readily accounted for, from the large proportion of animal substance remaining on the shell or entering into its composition.

If the argument is pursued farther, from a chemical point of view, you will find that there exists in our grains a sufficient proportion of carbonate of lime to answer all the demands of nature in the construction of the shell of the egg. Finally, it is against all the analogy of nature to assume that an animal, with its functions in normal condition, requires any mineral as

food which has not first passed through the wonderful laboratory of animal or vegetable life.

I shall be pardoned by my audience for having dwelt somewhat at length on this subject, for I think it affords a striking instance of a want in the community of correct observation and thorough experiment. Correct observation would have brought numerous instances to light in which fowls have readily produced the daily egg to order, properly cased in pure crystaline white, without access to any lime whatever, the whole winter through; experiment would have taught that the natural appetite of the fowl is satisfied when the minerals fed to them are of convenient size, hard and angular, *let the composition of them be what it may.*

We can dwell but little longer on this division of our subject. Who of my hearers, after having carefully studied an article in our agricultural press detailing some interesting experiment, has not often found it necessary to obtain from the writer of that article more information before he could repeat the experiment or know what value to set upon the apparent results; who has not found in such articles some wide, unbridged chasm between his cause and effect or the mistaking of a sequence for a consequence? I repeat but an axiom when I say at this late day, that the farmer needs a thorough education as much as any other class in the community; and to make the full, round, thoroughly developed farmer, educated up to the full demands that the calling has for his spiritual and intellectual nature, no mechanical employment, no profession requires so thorough and extended an education. No one can make the records of observation and experiment a study without having an overpowering sense of the grandeur and extent of the unexplored world before him, and of the necessity of educated intellect to filter out the crudities with which these records abound. Truths in nature are not to be so easily learned as the public at large presume; nature is coy of her secrets in proportion to their value. Through a long, dark night of ignorance has the careful student noted facts, and the philosophic sage compared them in all their relations, and generalized with thoughtful brow, but as yet the morning has hardly broken: knowledge in agriculture appears as but a phantom, flitting in the dusky

twilight and eluding our most earnest efforts to secure her in our grasp and fix her habitation.

I have read nothing more interesting in illustration of the hazard of drawing too hasty a conclusion from our experiments, than the valuable records of the Board of Agriculture, of the experiments made under their supervision at the State Farm. If the results of these should be nothing more than the impressing of the public mind with the number of conditions which enter into a reliable experiment, they will have performed a great service. To follow, with complete success, the steps of a successful experimenter, I should want to ask him a great many questions: What is the character, composition and condition of the sub-soil? The depth of the upper soil? The mechanical condition of it? The chemical constituents of it? Its *digestible* constituents (for what are not in digestible condition are of but little moment)? What is the lay of the land? What manure was applied the two years previous, and what crops were raised upon it? What manure was applied the year of the experiment, and what was the condition of the manure? Upon what had the cattle been fed? If barn manure, how had the manure been kept? Was it fresh or partly fermented, and how was it applied? How wet was the season, and how hot was it all through the growing portion of it? These and many other questions must be answered before I can feel myself on the road to complete success: and not only must they be correctly answered, but the information obtained, correctly applied to my own soil.

Before leaving the contributors to our agricultural press, there is one class of whom I would say a word: I mean that class of contributors, many of whom farm largely but are not farmers; a class who have a strong natural interest in agriculture, but whose callings in life lead their feet in a way their hearts go not. Articles from this class, from the results of superior educational advantages, and from the fact that standing outside they may survey a larger field, are sometimes better written than those by the practical farmer, who may excel in point what he lacks in finish. Articles by this class are often characterized by an elastic enthusiasm, if not fine poetic glow which catches the very spirit of nature. On the other hand, they are sometimes characterized by a defect which will always

be found in the writings of those in whom theory and practice go not hand in hand—a too hasty generalization; they need the curb of a thousand unforeseen failures which practical experience alone can give. This class are apt to map out the hours of the farmer after the day's work is done to various intellectual pursuits. Certainly they are to a degree right; every farmer ought to devote a portion of his time to the improving of his mind, but in this hard-working Yankee land, over-worked as the farmer now is during a large portion of the year, the proposition, in a general application, is impracticable. The idea, which is very prevalent, that the body can be exhausted by work and yet the mind be left bright for study, is an absurdity, as every one who has tried the experiment knows. The mental powers cannot work without a supply of vital vigor any more than the body, and after the body has exhausted the vitality of the system, what is there left for the mental powers? It has been remarked of pugilists, that as a class, they are but little above idiots, almost the whole of their vitality having been absorbed in the excessive culture of their bodily powers. It is a great misfortune to any tiller of the soil to find himself usually incapacitated after the labors of the day are closed, for profitable reading or study; the wisest philanthropist for such a class is he who can teach a fellow mortal how to lessen the number of his wants, or introduce improvements in agriculture, such as improved implements, whereby equal work can be done as thoroughly and more speedily and with less wear and tear of the man than under the old system. Mowing machines, grain threshers, the steam plough, and like products of human ingenuity, march nearer the van of an improved civilization than many of us conceive of.

AGRICULTURE IN THE PUBLIC SCHOOLS.

From an Address before the Middlesex Society.

BY RUFUS P. STEBBINS.

The appropriate and important question to be asked and answered to-day is most obviously this:—How can farmers and mechanics evince and vindicate their right to be classed among the honored and honorable of the earth? How can young men and young women be convinced that it is as respectable and far more profitable and prosperous and delightful, to till the soil and manage the dairy and furnish the wardrobe and the table, than it is to sell merchandise and ply the needle, play the exquisite and the belle? The answer is swift and conclusive. These occupations must be raised to the rank of arts by their intelligent, scientific pursuit. The reasons of things must be known, and then farming will be a delight, not a drudgery, an honor, not a disgrace, both in its pursuit and result. How then can this knowledge, essential to the highest success, to any success in your calling, be obtained. *In our public schools.*

I know as the public schools of the country are usually conducted, little or no attention is paid to practical science. Children are taught to spell Ompompanoosuc, and name the rivers in Ethiopia and Siberia, but they are not taught why a silver spoon is tarnished by boiled eggs, or a knife by cutting an apple. They are not taught why deep ploughing prevents the severities of drought, or why guano is a good fertilizer on some soils, or whence comes the carbon of the forest trees. They are not taught the difference between boiled and roasted meat, and why bread is heavy. Silver dollars are put into the churn to bring the butter, and pork is killed at high tide or full of the moon, to prevent shrinkage, because our schools spend more time in teaching the extraction of cube roots, than the extraction of butter from cream. The science of cooking,

on which health and life depend, is not taught, but algebra is. So our young wives prefer boarding to house-keeping, since they can work quadratives but not the kneading trough; they can explain the binomial theorem, but not the nature and action of yeast. It is no fault of theirs. It is the fault of the system.

Our modes of education are defective, and need renovation. Boys and girls should be taught in school the science of agriculture and cooking, as they are now taught arithmetic and grammar. They should understand from germination to maturity, the process of growth and the food of every crop, every vegetable raised. Its parts and the uses of each part in its growth should be known to them as well as the uses of the parts of their own bodies,—their hands, their feet, their eyes, their ears. They should know, moreover, all the weeds on the farm, their character and relative damage to crops, and how to exterminate them. These subjects should be thoroughly taught and illustrated in their schools. The young mind thus becomes interested in future pursuits, and enters upon them not as a task but as a pleasure. Labor thus becomes a profession, not a servitude; it becomes attractive as any other art, more than many now sought for. Botany, or the study of plants, grains, vegetables, should be a prominent study in our common schools; commenced with the alphabet, and continued to graduation, so that every boy and girl fourteen years of age can not only tell the growth and food of every grain, and grass, and vegetable, but also just what soil, and season, and fertilizers are best for it. Chemistry, also, should be studied from the earliest period till the latest, as we now study arithmetic and geography. It is vastly more important to a person to know the prime gases, than the prime numbers; the circulation of oxygen is something much more necessary to be understood than the circulation of decimals; and unlike fractions, many persons reduce their farms to the lowest terms, because they *haven't learned* how to do it. Chemistry should be studied till the composition of every soil and its adaptation to grains and grasses and vegetables is understood, just as well as the adaptation of the stomach of the horse, the ox, the camel, the fowl, to their different kinds of food and methods of digestion, is understood.

The scholar should know what wheat eats, and how to supply it with food, just as well as he knows what an ox eats, and how to feed it. He should know the different diet of the potato, and how to feed it, as he knows the different diet of the cat, and how to feed it. The cat does not live on grass, nor the ox on mice. Wheat and potatoes do not eat precisely the same food, yet who thinks of preparing the field for the wheat differently from that for the potato, as he would prepare differently the stall for the ox, and the dish for the cat. Taste of the quince and the pear,—have they not fed on different food? Do not asparagus and squashes demand different diet? All this, and much more, children should be taught in our schools. Then, when they go upon the farm, it will be with the curiosity with which the chemist enters his laboratory—not simply to see how much money they can get, but how much they can enjoy and discover.

I press this point. Our system of common school education is seriously, not to say radically defective in this respect. Arithmetic, geography and grammar are studied to the neglect of other more important and attractive branches of knowledge. Teachers should be trained in our Normal Schools, not in algebra and geometry only, or chiefly, but in botany, and chemistry, and meteorology. Three hundred and forty-five students were at the State Normal Schools in 1857. Of these, one-half are the sons and daughters of farmers and mechanics, and all are to be teachers in our public schools—the only school which a great portion of the children will ever attend to fit them for the duties of life. The expense of these schools, exclusive of the real estate, is about fourteen thousand dollars annually, and worthily is it applied in spite of the deficiency which I shall name. I find no special statement in the reports, of the amount of time given to the different studies pursued; but in the Westfield School I find botany *optional*, one of the most important studies to farmers, and also bookkeeping. At Bridgewater, the proportion of time given to literature, as distinguished from scientific studies, is as three hundred to five hundred; only three-fifths as much time is given to the sciences on which all agricultural and mechanical labor and success are based, as to other studies. Whether botany can be studied, even if desired, is not stated. The reports of the schools at Framingham and

Salem, give no information respecting their attention to these subjects. This is a serious matter, and deserves of farmers and mechanics close scrutiny. These Normal Schools should be so conducted that teachers will come out from them qualified to teach those branches which will make labor a luxury, and the laborer skilful and intelligent.

There is much said now-a-days of a farm school for the State. I have but little faith in the result of such great and expensive establishments. They make mostly fancy farmers, and do not help farmers' wives at all in their chemical laboratory,—the kitchen. The principles of farming should be taught in every district school, and fully illustrated in the high school. The management and studies of these schools demand the attention of the thoughtful of all classes. They absorb nearly or fully one-third of all the moneys raised for school purposes, in many of our towns, (and wisely, if it is rightly expended,) while the scholars in attendance are less than one-tenth of the school population. And more important still is the fact that sometimes nine-tenths or more of the scholars in attendance are spending two-thirds of their time on studies which are of no value in practical life.

Our high schools are now often conducted as if the scholars of New England were residents of ancient Italy, and cattle were to be reared and crops raised with Virgil's Georgics and Bucolics as a hand-book. The housewifery of our daughters is taught from the domestic economy of Dido, and their delicacy beautified and their modesty perfected by mining syllable by syllable into the story of her shame! Boys who are fitting to be builders, are required to study, word for word, the syntax and etymology, and line for line the construction of Cæsar's bridge, who never receive a word of information respecting the strength of timber or the names of the parts of an ordinary dwelling! Young aspirants for political honor, ardent to become selectmen, assessors, school committees, possibly representatives to the great and the general court, are thoroughly drilled in the municipal regulations of Rome, and thumb out of their dictionaries with perspiring agony and muttered execrations, the majestic utterances of Cicero against Cataline, when they know nothing of the duties and responsibilities of a field driver, or that such a speech as that of Webster in reply to Hayne, is in existence.

It is true that the law requires schools to be kept in towns containing five hundred families, in which Greek and Latin can be taught. But it by no means requires that all the scholars who attend these schools shall study them. And it is hardly just to ruin the practical education of nine-tenths of the scholars, for the sake of fitting one boy or ten for college. The education of the scholars in our public schools should be such as to make intelligent men and women in the great industrial departments of life. Farmers and mechanics, look to it that your schools do this work for which they were established; then agriculture and mechanics will be arts, not drudgeries.

The reason why labor is repulsive, and considered a curse, is because it is blindly directed, unintelligent. The attainment of food or money is the only motive to work. Appetite or avarice goad men to the field or the shop; the palate is the lash, and the purse the garner. They do not go because they delight in the art of tilling the soil and constructing the machine, as the artist goes to his studio and makes the landscape glow on his canvas, or the bosom warm in his statue. But the farmer and mechanic should so work, and would so work, if they understood the philosophy of their profession, the chemistry of their art. They would go to their fields and shops as boys go to a holiday.

I am not saying that work is not work. Play is work, and the hardest of work. And all work should be so saturated with intelligence and interest, as well as with sweat, as to make it a luxury.

Another reason why agricultural life is not made attractive and a delight, is that too much soil, as well as too little soul is employed. Quantity instead of quality of soil is regarded. Muscle and not mind is put into the work. Large fields are tormented amidst much sweat and fretting, to yield a poor crop of poor grain; small fields are not tilled with little sweat and many smiles to produce abundant and excellent harvests.

Science and labor well applied, will, I suppose, double the quantity of the crop on most acres now tilled in this county, and bring twice as many into tillage as are now occupied. We have run mad as individuals and as a nation with a rage for more territory. The time is not distant when it will not require half a township to keep a good dairy of cows. What is wanted

is not more acres, but better crops. We must acquire possession towards the centre, not towards the circumference of the earth. Cut feed and roots from a few acres will do it. "A little farm well tilled,"—to say nothing of the remaining line, so admirable,—is better than a large one poorly scratched. The desolation of the old way of tillage has starved to emigration the rising generation. One son remains, perhaps, on the homestead; the other three, more or less, are away, seeking their fortunes. One has gone to Pike's Peak, to return as peaked as a pike. Another is distributing hand-bills of menageries, holding stirrups for circus riders, or cleaning harnesses in hostelries. The third, most pitiable of all, with white kids, French boots and ratan, submits to the perplexed barber the thinly scattered down on his white cheeks and lips, in the presumptuous hope that a respectable beard can be made to grow, or a tolerable moustache sprouted on his thin soil! The old farm should rather have been divided into three or four, and improved culture would have made each new third or fourth, better than the old whole. My observation, and it has not been limited, from the great wheat fields and cornfields of the West, in which I have ridden from morning till night, at the rate of twenty-five miles an hour without reaching the other side of them, to my own farm sixty feet by ninety,—my observation has convinced me that the evil of New England farming is that there is too much soil tormented, I will not say tilled. Ten acres well tilled, under the guidance of intelligence, would be more productive than some one hundred and fifty acre farms now are. It is better to raise one hundred and sixty bushels of corn from two acres than from ten. Or ninety-two bushels of oats, (like Mr. Henry Kendall, of Barre,) from one acre than from three. It is pleasanter to do it, as well as less labor. It is as well to raise twenty-five or thirty-bushels of wheat on an acre as to so timidly distribute the crop that you may shoot quails in it without hitting or hazarding a stalk. Diminish the quantity, increase the quality of your soil.

I know it is expensive to purchase fertilizers, but it more than pays. Once commenced, the more you spend the more you obtain. It is poor economy to diminish the expenses which enrich the soil. Indeed, improved soil, not money at interest, is what the farmer should seek. In ten years, if you please, he

has doubled the producing capacity of his farm; that is far better for him than its original value at interest. The soil is the farmer's bank. He there deposits his income, and it will never dishonor his draft. Farmers are too anxious, like all the rest of the world, to make money; let them make soils, which are better than money. This will take to itself wings and fly away, but the earth abideth forever. Money invested in fertilizers is the best investment for farmers.

But there are methods of culture which enrich the land, as well as fertilizers; and two of the best with which I am acquainted, are deep and frequent tilth or stirring of the soil. Our culture of the soil is not deep enough. We skim the surface not so deeply as our wives skim their milk, and at the depth of from six to ten inches the soil or earth is as hard as Pharaoh's sward. This is all wrong. The soil should be made light, at least eighteen inches deep. The salts which have filtered through the first six or ten inches, all lie dormant below. This is one reason for deep culture; and if there were no other, a sufficient one. But there is another, it is the preservation of moisture, and defence against drought. I have tried both in my garden, and of course know whereof I affirm! I have seen them tried on a larger scale by subsoil ploughing, and the crop increased one-quarter, in some places doubled the first year. Try it, if you doubt it. Dig the soil two feet or twenty inches deep in half your garden, and the remainder only eight or ten inches. When the dry weather comes on, see how parched the soil will be, and how withered the vegetables, on the shallow culture, and how moist the soil, and fresh and luxuriant the growth, on the deep culture. Frequent stirring of the soil is also enriching. I have seen this tried with marvellous success. An old field, which had been scratched over and sown to rye, year after year, till it would not produce so much as penny royal and rattle boxes, was permitted to rest one year, because it would not pay to plough it. It was then fallowed and twice ploughed, in the last of August and first of September, and sowed to winter rye. The crop was good.

But the experiment to which I would especially call your attention, was on an acre of the same sixteen acre field. This acre was prepared for wheat. It was ploughed six or seven times, in the forenoon chiefly, when the heavy dews were on,

but only to the usual depth. The soil was rather stiff, but these repeated ploughings made it light as an ash heap; the soil was completely pulverized. The wheat with which it was sown looked finely in the late autumn, but was all winter-killed, and in the spring oats were sown instead. There was a very heavy crop of oats, and for not less than six years after this repeated ploughing, that acre could be easily traced by the richer feed when it was in pasture, and heavier crop when it was tilled. The division was traceable within a foot of the line of frequent ploughing. I have no doubt if that acre had been subsoiled in the first or some subsequent ploughing, the crops for six years would have been one-third greater than those of the adjacent land cultivated in the usual way. This finely pulverized soil absorbed from the air fertilizing properties, carbon and ammonia, especially as deposited in the dew which was turned in by the plough, and each particle of soil being exposed, became enriched thereby, while in ordinary culture but very little of the soil comes in contact with the air, and hence is not in a condition to promote vegetation. I need not say in New England that hill-side land should never be ploughed up and down hill. This kind of bad tillage was a gift possessed universally by the farmers in western Pennsylvania. I seldom saw a field ploughed in any other manner. Of course both the soil and the hill were fast descending into the valleys.

I have said so much of the culture of the soul and soil, that I have left myself but brief space to speak of stock and fruit. Good stock is the cheapest to raise, and worth the most when it is raised. The old fashioned, great-boned, coarse-haired, long-legged, lank-bodied cattle, greedy as famine and tough as iron-wood, which once did any thing but grace the hills and stalls of New England, have almost disappeared. They could eat and run against the world. Voracious as anacondas, and as lean as death, they kept the farm poor. There is, it is true, much sham in the fancy stock of the present time, but vast improvement has been made. In cows and oxen the advance has been very great. It is pleasanter, if not cheaper, to keep a good cow than a poor one, and her value, as a producer, is three-fold that of a poor one. I am sorry there is not on the ground a good specimen of an old fashioned swine, I will not say porker, because, unlike the celebrated animal whose loins

graced the table and allayed the animosity of the notorious Jack Spratt and his honored wife, these had no fat at all. Fleet of foot were they as grey hounds; their self-sharpening shares, with which they did divers large and small jobs of ploughing about the doors of their owners, rivaling in length and excelling in durability the latest patent of Nourse & Mason.

Of fruit I will say but a word, though tempted to do so by the luscious display on the tables. I have serious doubts about the success of many of the foreign varieties introduced, and am very well convinced that the process of hybridization will prove to a great extent a failure. The varieties produced are not hardy, and soon run out. I advise you to cultivate our native varieties, and I am very desirous that our native wild grapes should be domesticated, and a fair trial made of what cultivation will do for them. It would be but little trouble, and might, I believe would, be successful, as the specimens exhibited abundantly prove. Our foreign and southern grapes are too tender, they will not bear our climate. We must have more hardy varieties, unless some of these can be acclimated.

A sad blight seems to have fallen upon the peach trees in many parts of New England. Some towns are now almost entirely destitute of that fruit. It would be well to inquire what varieties are most hardy, are less exposed to disease, and cultivate them. This can be done by farmers' clubs in different towns, exchanging their experience and observation with each other, and thus accumulating facts till the best kinds can be selected, and the best culture devised.

I do not intend by all these suggestions to imply that under the best culture, and with the best aid of modern science, crops will always be insured. The sunshine and the rain, the snow and the cold, are elements over which man has no direct control, and yet are most efficient agents in the growth and maturity of crops. God so governs the world as to cause all who will look intelligently upon nature's processes, to see his hand, and feel their dependence upon powers over which they have no direct control. I do not say either that farmers will be necessarily the most moral class in the community; but I do say that their temptations are fewest, their opportunities best: I do say that for security, comfort, serenity, success, I know of no occupation better than that first appointed to man, tilling

the ground—intelligent husbandry. The greatest hindrance to entire success in this department, at this time, is the indisposition which constitutes, to a great degree, the inability of farmers to live on and from their farms,—to so abridge the luxuries as to multiply the comforts and moderate the labors of home. Large and often expensively furnished houses are the farmer's curse and the mechanic's bane. Snug, neat, convenient houses, filled with smiling faces and song, are better than large mansions of unoccupied rooms, requiring expensive repairs, occupied by indebted, and hence peevish families. As I travel about the country, and see from one thousand to three thousand dollars expended in rooms which are not occupied, almost never opened, —and this is wise, for it saves wear, both of furniture and housewife,—I am pained at the waste of means which add no comfort, and hardly minister even to the pride of the owners or occupants.

THE DUTY OF THE FARMER TO HIS CALLING.

From an Address before the Middlesex North Agricultural Society.

BY GEO. S. BOUTWELL.

The demand for cattle has outrun the production. This has been in a degree demonstrated by the average high prices obtained for the flesh of animals, and the extraordinary prices paid for their hides. And this, notwithstanding the large and continuous supplies received from the wilds of Africa and the pampas of South America. It is not probable that the supply of foreign hides can be continued, omitting, for the moment, to consider the annual addition needed to meet the increasing wants of this and other civilized countries. The fault, you may say, is with the manufacturers, who ought to make shoes so good that one pair would be equal, in serviceable value, to three pairs of the quality now usually furnished. This is all true; but the chance of reform is not such as to justify sanguine expectations. It is more practicable to increase the number of cattle. Our long winters are no doubt unfavorable: but lands are not expensive, and the pasturage in most parts of New England is of an unusual quality.

It will not be out of place to mention an error into which our farmers generally have fallen. In clearing lands for pastures, no attention has been paid to the circumstance that forests upon the summits and elevated declivities of hills and mountains are reservoirs of water and storehouses of decayed and decaying vegetation, which irrigate and fertilize all the lands below. But when, as is often, or, indeed generally the case, the the summits are cleared of woods, then the process of impoverishment commences, the soil is gradually washed to the plains, meadows, and streams, and there remains no efficient means by which the lands can be restored. It is also to be considered that forests upon the highest points multiply the showers of summer

upon all the country round, while their presence so adds to the beauty of the landscape, that the scene is alike acceptable to the rustic and the artist. Is it not then, for the advantage of New England, with reference to beauty and economy, that the forests should be preserved and cultivated upon all our hill and mountain summits? Moreover, we should allow the most vigorous and the most majestic of the trees of the forest to remain; and here and there should be seen copses of wood, which relieve the dreariness and monotony of the open field, and furnish acceptable retreats for the cattle when they are scorched by the mid-day sun, or teased by the insects of twilight.

In New England there can be no efficient, and of course, no profitable farming, without a supply of manure at small cost. This must be obtained from and upon the farm. It may be wise to purchase imported and manufactured fertilizers for occasional aids, or they may properly come to the relief of the market gardener; but the common farmer must rely chiefly upon the product of his own yards. And if it be also further true that what is destined for the market, should be concentrated as much as possible, it is then seen that every farmer should keep a stock of cattle equal to the extreme capacity of his farm. Neither hay, grain, nor roots should be sent away; but rather be converted into pork, beef, and milk, or as the wiser in the end, into butter and cheese. It is only by this course that fruit culture can be successful in places remote from large towns, which usually furnish an abundance of manure for the lands in the vicinity. Fruit orchards are profitable, but they need as much manure as cornfields.

It is a singular, and not altogether credible, intellectual and social phase of our agriculturists, that they continually complain of the expensiveness of labor, and with great pertinacity resist the introduction of machinery. Now a decrease in the price of labor is not probable nor desirable; but we should seek to make the operative's labor more advantageous to himself and more advantageous to his employer. This can be accomplished by the aid of machinery.

Production should increase. We must use mowers, reapers, horse-rakes, improved ploughs, harrows, and all the improved implements of husbandry. I am conscious that we are to meet the old inquiry, "If machinery is to be extensively introduced

how are human hands to be employed?" Reflect, if you please, upon the progress of this country by which the power of machinery has been substituted for manual labor, and yet there has been no evil result to the laborers. The ability of the world to consume is not comprehended. With civilization extended and the arts of peace cultivated, there is no doubt that eleven hundred million of human beings upon the globe, may consume all that they can possibly produce with the aid of such machinery, as is, or may be invented. The only result of increased production, in a condition of peace and free commerce, is that every person enjoys more of the necessaries, comforts and luxuries of life. It should, however, be observed that the invention of machinery is more beneficial to the laboring, than to the non-producing classes. Machinery may change the vocations of men, but there will always be opportunity for labor.

There is no necessity for anxiety on this subject, yet, in Europe, a new invention is often the occasion of a riot, or an unpleasant public demonstration. Our brethren from Ireland have been justly charged with occasional riotous conduct in America; but the charge is set off by the imputation now resting upon Americans of producing a riot in Kilkenny, Ireland. The farm laborers in that district were so excited by the introduction of horse reapers from this country, that the machines were destroyed by an ignorant mob, and the owners threatened with disagreeable treatment. The laborers of America ought to be far, very far, in advance of the rioters of Kilkenny. Let this prejudice cease; for machinery is, doubt not, a chief means by which farming is to be rendered so profitable that laborers may be better compensated than they are at present. The introduction of new and valuable machinery is every where and always a blessing, while a deficiency in the supply of a staple raw material, as hides or cotton, is an evil that effects every class of society.

Much is said of the respectability of labor; but it availeth nothing for me to declare from this platform that you are a highly respectable class of people, and engaged in the noblest pursuit that has received the attention of men. If this be true in your case, it is because you are intelligent in your vocation. The judgment of men has been, and ever will be, uniform upon

this subject. Labor is respectable when it is associated with a good degree or with a high order of intelligence; and it is considered menial whenever and wherever it is associated with servility and ignorance.

Now, then, if you desire to make your industrial character respectable and respected in the eyes of men, you must not only maintain your present position, but you must make continual advances in the acquisition of knowledge. You must send into the public schools, where your children are educated, true principles, doctrines, and ideas of learning, with reference to agriculture, and with reference to all things else. The laboring population may be made intelligent by public schools, public libraries, state agricultural associations, county associations, and lectures upon agriculture, mechanics, history and general learning.

Be not, my friends, afraid of knowledge in agriculture; be not afraid of *book-farming;* be not afraid of science. Learning is not dangerous. Occasionally there may be a person who believes that learning unfits us for manual labor, but generally we have outgrown this delusion, and are prepared to accept the truth that it is for the welfare of society that every man should be educated, that he may do the work to which he is called in the best possible manner. And you can only do this by laying broad and deep your system of public instruction, and guiding, guarding, and cherishing it under the pressure of hostility and in the presence of temptation. A generation so educated as to do fitly and well the work that is to be done, must inevitably be a wealthy generation. And assuming the existence of habits of industry and the possession of average virtue, every generation possesses wealth in proportion to its intelligence. Has it ever happened, except in occasional cases, that an individual or a nation escaped from poverty until he or it first escaped from ignorance? A striking illustration of this fact is seen in the recent history of Ireland. Within the last ten years the foundations have been laid, through the wise policy of England, and the generous concurrence of the leaders of the Protestant and Catholic churches, for the education of the people, by the establishment of public schools. This movement, in connection with the distribution of landed estates, has in a degree already disenthralled and redeemed Ireland; and in twenty-

five years, when a generation of educated people shall occupy that island, there will be a return from agriculture, manufactures, commerce and the mines, sufficient for the comfortable support of twelve or fifteen million of people.

This is the fruit of universal education in a country benighted and degraded in all the historical centuries of its existence.

It may be proper also to suggest two things to those of you who are heads of families and farmers of experience. First, when you have a hundred dollars, and your debts are all paid, do not purchase stocks, nor lend it to some friend who, as you think, may make a better use of the money than you can, but rather invest it in trees, or fences, or farm buildings, or underdraining, or manures. Put it somewhere, so that under your own eye, and without the risk of loss, it shall yield an income, but whether four or six, or ten per cent., is quite immaterial. In this way you secure safety and also the certainty of some adequate return. Secondly, if you have a boy of promise, a boy of whom you have hopes, educate him in the idea that he is to take a farm; that it is an honorable department of business; give him a chance to do something in the world, and do not hold him to the dismal doctrine that every thing must be done after the fashion that you followed or set. Believe in progress in agriculture, and, consequently, tolerate efforts to do things in new and possibly better ways.

Farmers cannot afford to be rash or inconsiderate in the adoption of new processes and theories; but it is their fault, oftentimes bordering dangerously on criminality, that they resist all innovations and hold their sons and successors to a disagreeable and unprofitable allegiance to old and out-worn practices.

Educate your families, daughters as well as sons, in the idea that farming is respectable. It too often happens that our sons and daughters look upon the farmer's life as a life of drudgery, and they willingly resign it for whatever else is offered. The result is attributable, in part, to the fact that the agriculturists have resisted the refining influences of modern civilization. As far as this civilization has taught the incompatibility of labor with intellectual and moral refinement, they have done well to resist its introduction. Yet the refining and elevating education of society ought not to be resisted, nor ought its influence to be

prejudicial to labor. The young women of New England need an education that shall be refining intellectually and morally, and that shall fit them for the duties of the household, so that they may aid or preside with delicacy, grace, and refinement, and perform the necessary labors of life, never repining nor complaining of their lot. When the young women of New England are so educated, the whole class of agriculturists will be elevated in exact proportion.

I have said, my friends, that agriculture should be refining as well as profitable and respectable. It should be—if you will allow me the use of a word not English—æsthetic; that is, refining intellectually, morally and socially, so that the home of the farmer may be attractive to all, young as well as old. The life and the home of the farmer are free from temptation; and there is no reason in the ordination of nature nor in the decrees of Heaven why he should not be a prosperous, intelligent, virtuous, happy man. Free from temptation, devoted to progress or to science even, without occasion for anxiety or the disturbance of temper, by which wounds more fatal and more numerous than those of the sword are inflicted, with sufficient exercise for bodily and mental health, he secures the great boon of long life. Every farmer has security in his profession for ten years more of life than is accorded to other men.

AGRICULTURAL EDUCATION.

From an Address before the Worcester West Agricultural Society.

BY GEO. B. LORING.

The business of farming in this country, rests in the hands of the people, and it is for them to say, whether it shall be well done or ill. Consider for a moment what an advantage agriculture possesses here, over the same pursuit under that state of society in which large landed estates are cultivated by tenantry or peasantry, controlled by a master. In the one case, all the strongest impulses of man's nature are appealed to, and his call to duty comes from the most powerful forces within himself; in the other, a reluctant service is paid to a superior, or emulation is excited by a subservient attachment. The New England farmer goes forth in the morning to toil upon his own acres, looking forward as each hour goes on to the rewards of his industry, enhanced and magnified, and sweetened by that subtle and unshakable satisfaction which possession alone can give. Between himself and the animals which graze upon his green slopes, there is a bond of union, which makes their proportions fairer to his eyes. Each plant of his growing crops is clothed for him with a sort of human interest, unknown to any other plant on the face of the earth. All through the long day, in the brisk labor of the early hours, in the trials of the noontide heat, in the weariness of the declining sun, he is sustained and refreshed, and stimulated by a feeling of alliance with all about him, and with a deep and perhaps unrecognized consciousness that upon the face of his farm he is writing the history of his practical life on earth. He returns in the evening to his own home, his own fireside, his own family, and finds there an appeal to his better nature, which no man can resist, and which calls on him to adorn and embellish, and refine that spot, which

if dark, and gloomy, and low, casts a heavy shadow over all his path through life.

Now, gentlemen, ought not a community of farmers possessing such inducements to labor, accomplish more towards the development of agriculture, than any individual however rich and powerful he may be, applying to the same extent of territory a tardy and servile power? True, the experience of the world may show that this is not the case. There were better farmers in the days of Cincinnatus, and there are better farmers at this day in Europe, than are found in our own country. But is there any reason for this? Are the freeholders of New England just to their birthright, in allowing such a contrast to exist? Do you tell me that our climate is unpropitious? Would you exchange it for the heats and droughts, and tornadoes of the tropics? When you hear of the failure of crops in "the land of the cypress and myrtle," when you learn that the staple product of one whole island, the most genial on the globe, is cut off, perhaps forever, and that from Madeira will come no more the rich and rosy wine "that maketh glad the heart of man," do you not turn with renewed confidence to the land whose seasons have not yet failed, where every man is rewarded according to the deserts of his labor?

The soil and climate of New England respond to well regulated industry, and cherish those virtues which belong to a hardy and industrious people, for the absence of which no tropical luxuriance is any compensation. Every thing about us demands that we be good farmers. Every thing about us forbids that we be bad ones. The products of our soil are in proportion to our skill and industry in cultivation. Every rod of drainage brings its inevitable reward to him who constructs it skilfully, with a degree and a certainty unknown to any other branch of manual labor. Every cord of manure judiciously applied, returns to its owner its hundred fold. And if any one of you doubts this, let him purchase an acre of ground and try the experiment, or let him go with me to the profitable farms of those who have already tried it. There is not a mechanic's shop, not a mill in your county, in which actual labor is so well rewarded, as it may be on these acres. We should never repine, we should never complain, we should never be deterred by any of those difficulties which as farmers we are obliged to

overcome, for we have every inducement to be patient, industrious, and intelligent in our calling. Let every farmer in this county resolve that he will farm well, that he will faithfully discharge his duty to the land intrusted to his care, and your agriculture may surpass, in all its economy and proportionate results, in its actual prosperity and in its general beneficence, the agriculture of the old world, as far as the enterprise of a well educated and busy community, outweighs in magnitude and importance any effort of which a single individual, under any circumstances, is capable. For the accomplishment of this, I would urge upon you an early and well ordered system of agricultural education.

But does some veteran among you, whose locks have whitened in the seasons of his three score years and ten, and whose muscles have become rigid under long continued toil, remind me that the weariness of labor prevents the cultivation of the mind? Let me tell him, with profound respect for his years, and for the honest and industrious life which he has led, that one great blessing of the culture which I am urging is, that it lightens the load of toil, and directs labor in easy paths. Had he appreciated this in early life, and prepared himself for his business by studying the thoughts and experience of others, would he not have avoided many an hour of ill directed labor, and long ago have felt how unerringly a cultivated mind guides man's hands. Suppose he had entered upon his farm with something more than his youthful observation and the experience of his father to guide him, trained perhaps in a school of agriculture, where the principles of the great art were instilled into his mind, would not the leisure hours of his life have been multiplied, would not his labor have been more effectual, would not his fields have been more fruitful, would not his days have been brighter? A cultivated mind creates its own opportunity, and is watchful of every passing hour, ingenious in making a moment of leisure for its own purposes. For the farmer, there is the noontide hour, the quiet evening, the withdrawal from his fields compelled by storms and winter, in which he may store his mind with that knowledge which will make him more efficient when he returns to his work. No laborious occupation demands for its proper accomplishment more mental culture than farming, and none furnishes better opportunities for

obtaining it. The mechanic learns his system and his work is done, whether it be to make a shoe, or build a house, or set in motion a machine. The merchant learns his business, and sagacity and an irresistible pursuit of gain perform the rest. But to the farmer belong the discoveries of science, the skill of mechanics, the problems of the weather, the investigations of that great book of nature which is always open before him, and which bear immediately upon the business of his life. While other trades do not invite to books, or have no literature connected with them, or by congregating men, inflame their minds and perhaps corrupt them, farming has its quiet influences, its own important subjects, its special learning, its books, and its various and important interests, which the human mind has not yet exhausted. There is leisure for such education as agriculture demands, for such literature as its affords. And while the labor of the mill is relieved by reading, while from the quarries comes forth a Hugh Miller, and from the forecastle a Bowditch, while clerks and merchants, and mechanics associate for intellectual relaxation and culture, and while our cities are filled with libraries and a thinking population, let it not be said that the farmer has no time to bestow upon his mind, and a country life no inducement for healthy thought and education.

And, then, gentlemen, in addition to the practical advantage to be derived from a good agricultural education, there is the unbounded solace and relief bestowed by books, which as Cicero says in his own sublime tongue, dwell with us wherever we go. We may accumulate all the luxuries and elegancies of life for ourselves, and those who come after us, but they are trifles compared with that best possession, that richest legacy, next to virtue and morality, a love of reading. It refines the whole life. It brings us into an assembly where companions may be found for all our finest tastes, our noblest impulses, our acutest thought, and where there is congratulation for our joys and sympathy for our sorrows. It fits us for labor, and protects us against the temptations which hang upon the skirts of idleness and ignorance, and find their existence there. The fit and appropriate volume—what has it not done towards sustaining man in times of trial, and guiding him with superior thought in his daily walk? Our own American Cicero, the

great advocate, the statesman, the intense and ardent lover of American nationality, who has just gone to his long rest, found a balm for his distracted brain, when, withdrawing from the controversies of the court room, he sought repose in the silence of his library, and learned that the "whole brotherhood of industry" may find there "rest from labor, succor under its burthens, forgetfulness of its cares, composure in its annoyances." And he says, with his own peculiar beauty: "Happy, then, is he who has laid up in his youth, and held fast in all fortune, a genuine and passionate love of reading. True balm of hurt minds; of surer and a more healthful charm than 'poppy or mandragora, or all the drowsy syrups of the world' —by that single taste, by that single capacity, he may bound in a moment into the still region of delightful studies and be at rest. He recalls the annoyance that pursues him; reflects that he has done all that may become a man to avoid or bear it; he indulges in one good long human sigh—picks up the volume where the mark kept the place—and in about the same time that it takes the Mahometan in the Spectator to put his head in the bucket of water and raise it out, he finds himself exploring the arrow marked ruins of Ninevah with Layard, or worshipping at the springhead of the stupendous Missouri with Clark and Lewis; or watching with Columbus for the sublime moment of the rising of the curtain from before the great mystery of the sea; or looking reverentially on while Socrates—the discourse of immortality ended—refuses the offer to escape, and takes in his hand the poison, to die in obedience to the unrighteous sentence of the law; or, perhaps, it is in the contemplation of some vast spectacle or phenomenon of nature that he has found his quick peace—the renewed exploration of one of her great laws—or some glimpse opened by the pencil of St. Pierre or Humboldt, or Chateaubriand, or Wilson, of the 'blessedness and glory of her own deep, calm and mighty existence.'"

Whoever has seen the care-worn and exhausted form of that great laborer in the law, as he turned his steps from the scene of his commanding intellectual efforts, to seek that repose of which he speaks, will feel how dear to him must have been every promise of rest to the heavy-laden. The painful languor of the cloister and the court room, that withering physical prostration which attends an over-tasked brain, finds but poor

relief in the feverish dreams which occupy the hours of repose. There is a fatigue which drives away sleep—a premature old age whose deep furrows are never filled, whose infirmities know no cure—the fatigue and old age of excessive mental application—compared with which, the weariness of the tired laborer is but the ebbing tide of high and exuberant health and strength.

The farmer, it is true, grows weary and old. But as night comes on it brings "tired nature's sweet restorer" to his frame, as surely as the dews fall upon the thirsty grass, and the petals of the flower close themselves against the chills of evening. The fresh air in which his muscles are hardened by labor, is the tonic for his blood, and he earns as the richest portion of his reward, "a sound mind in a sound body." Old age overtakes him, with its rigors and its weaknesses—but it comes at the appointed time, and may be to him the still and placid evening of a refulgent day. If his books have been the companions of his leisure and weary hours, they will not forsake him now, for they never fail—those faithful friends, whom we have but to know well, to love well. No disappointed ambitions shadow his declining hours; no memory of reckless personal hostility distracts his repose; the black fingers of malignant slander have not marred his page of life; the storms of controversy have not blasted him; the violence of opposition, and the necessities of his calling have led him into no devious ways; the sweetness of whose temporary triumphs, becomes at last the very "bitterness of spirit." A life in the forum or the market place offers no such close. The intricacies of politics, the struggles of the bar may require such repose, but they seldom find it. Cheered as it may be by the tastes which education gives, the world can show no calmer happiness. It is the very existence of all others to be made tranquil and happy by that love of books of which I have spoken, as one of the richest fruits of healthy mental culture.

And, gentlemen, the appropriate reading of the farmer has peculiar charms. Agricultural literature has temptations which few can resist. It forms a most important chapter in the history of the world. It contains the true economy of nations in their rise and fall. The connection between the sciences and the useful arts, the application of physical forces and of close analysis to the cultivation of the earth, the laws governing the

seasons, the results of experiments, the career of agriculture, are subjects of unbounded interest to all men. Who has ever grown weary over the marvels of ancient granaries, or lost his interest in the record of farming inscribed on the walls and tablets of the oldest nations of the earth? Who can forget that agriculture was the chief occupation of the chosen people of God, from the day that their founder commenced life in the service of Laban, to the destruction of their nationality in the "land flowing with milk and honey?" Who has not dwelt with admiration on the devotion of the Romans to the soil which they conquered, and on that agricultural pride which prompted them to name their most distinguished families from the products of the earth—Fabii, Lentuli, Pisones? Who has not warmed with delight over the words which Cicero puts into the mouth of the aged Cato—"I come now to the pleasures of husbandry, in which I take vast delight. They are not interrupted by old age, and they seem to be pursuits in which a wise man's life should be spent. The earth does not rebel against authority; it never gives back but with usury what it receives. The gains of husbandry are not what exclusively commend it. I am charmed with the nature and productive virtues of the soil. Can those old men be called unhappy who delight in the cultivation of the soil? In my opinion there can be no happier life, not only because the tillage of the earth is salutary to all, but from the pleasure it yields,"—words full of fresh and healthy delight to old and young? Who does not read with amazement of the agricultural wealth and enterprise of the Saracens and Moors, who made Spain a garden in spite of all natural obstacles? How interesting is the story of the dependence of all nations upon the farming community, of the levies for feeding armies—of the great purveyance by which the kings and courts of England were fed from the farm houses, on their journeys through the kingdom. How filled with deeper interest the first faint and feeble efforts of our fathers to raise their scanty crops on the sands of Plymouth, and on the rugged hillsides—cradling the infancy of a mighty nation in the maternal lap of agriculture. Could English literature be deprived of the writings of Fitzherbert, whose Book of Husbandry is as fresh now as when written more than three centuries ago—or of the practical wisdom of Jethro Tull—or of the thoughts of Smith,

and Lisle and Home, of Cobbett, and Arthur Young—could the literature of England be deprived of this, and not lose one of its chiefest charms, one of its national characteristics? Read the accounts of progressive agriculture in Scotland, Holland, France; read the miraculous success in subduing the hardest soils recorded in Talpa; read the ingenious operations of Mechi, and tell me if the Arabian Nights or the Happy Valley can carry the mind into sweeter regions. Follow our own Colman in his enthusiastic researches, and you may live in all the freshness of glowing country. Take if you will the text-book of the very foundation of all good farming, French on drainage, and the swamps and morasses and clay-beds of New England become to your mind as full of vegetable beauty as are teeming savannahs. Let your eye wander over the last State Report on Agriculture, lying on your table, and, before you are aware of it, you are introduced by your industrious and accomplished Secretary to the rural homes of a happy people, whose hills and valleys are alive with growing crops and with flocks and herds. And when you have faithfully toiled through the last leader of your favorite editor upon "the great doctrine of popular sovereignty," or upon our foreign relations, or "have supped full of horrors" upon murders and robberies, or have been lashed into indignation at some newspaper abuse of your best friend, lay this all aside, and take up your last agricultural journal—do you not feel at once with an indescribable satisfaction, that you "have kept the good wine until now?" It is indeed so. All men read the literature of agriculture with peculiar zest, and dream of farms, and are soothed and comforted with the hope of one day being farmers. And this literature is your prerogative, the text of your profession, the soul and spirit of your business, the thought which is freely offered you, and which will make you better farmers, happier men, if you will but learn to love it in your youth, and to cherish and cling to it in your old age.

Those of us who are engaged in farming should moreover bear in mind, that through mental cultivation have we arrived at our modern improvements in agriculture. One of the great necessities of the times is the economy of labor in the production of all articles of general use. In England and in our own country the laboring classes generally possess a due share of the

comforts of life. For the accomplishment of this, labor must be well paid, and the necessaries of life, provisions, clothing, fuel, must be obtained at moderate prices. It is just this state of things that exists, and constitutes the distinguishing feature of modern society, especially in this country. We pay the laborer well, and he feeds himself well. And that this may be done without impoverishment, we must enable the laborer to accomplish all that is possible during his hours of work. That equality of citizenship which makes us a free people, requires this elevated condition of labor, without which we should be free no longer. In order, therefore, to maintain our social and civil organization, we must furnish the producing classes with the most economical mode of working and living. It is in obedience not only to the general diffusion of knowledge, but to the commands of our free institutions, as well as to our enterprise and thrift, that we are devoted to improvements in agriculture. Perhaps we shall never cultivate the soil better than did the Egyptians, or Saracens, or Romans, or than now do the Chinese, but we must do it with less demand upon human time and strength, unless we would adopt that serfdom and despotism which doom the laborer to a life of penury and pain, and which requires no labor-saving machinery. Have you ever seen a mowing machine from Russia, or a steam plough from China? The ploughs in Lombardy are no better than they were in the days of Hesiod and Virgil. They tread out their wine and weave by hand there now, as they did centuries ago. Their condition as a people demands nothing better. It is really not until you arrive at your own shores, that you see the true genius of mechanical invention applied to the business of life. Our inventors are our benefactors. And I know no more remarkable illustration of the understanding and appreciation of national wants, which may occupy the mind of a great man, than the assiduity with which Jefferson, the founder of our free government, the prophet of the people, the friend of labor, the patron of popular education, devoted himself to the construction of the plough, according to the best rules of mechanics, representing not only American statesmanship, but the spirit of American agriculture.

It especially becomes us, therefore, as a people to encourage in every way agricultural education. We cannot farm well

without it, however strong may be our innate attachment to the soil, and however correct our youthful observation. The establishment of agricultural schools is a part of our duty as heirs of an untrammeled ownership of the soil. When France altered the tenure of land and distributed her territory among her citizens, after the great revolution, one of the first acts of her government was to educate the people into intelligent farmers. For this purpose she instituted agricultural societies, veterinary schools and model farms, where young men might be instructed in the theory and practice of agriculture by highly qualified teachers, and have an opportunity of witnessing the daily operations of the farm. Under the influence of these institutions the agriculture of France has been brought to a high degree of perfection. What government has done there, the people may do here. We want the rudiments of agriculture taught in our schools—mathematics as applied to measuring our land—tables of the solid contents of weight and measure—rules for the application of manures—modes and distances for sowing and planting—the early history of the great art. Would not this be as useful as algebra, or a smattering of metaphysics? We want a larger number of competent editors for our agricultural journals—men who would write of agriculture as an old divine did of theology. We want well educated and competent judges and committees for our agricultural societies—critics who would be able to estimate the true value of any mode of cultivation, the true quality and importance of a crop, the effect of successions of crops upon the soil, the economy and system of good farming, and who could subject the various animals submitted to their examination, to a careful, intelligent, systematic test of their adaptation to the farms on which they are kept, and to the purposes for which they are fed. We want agricultural colleges. We want model farms—not farms cultivated by "little wanton boys," as a punishment for unruly conduct, and where no definite and systematic mode of cultivation can possibly be adopted—but farms where young men may learn the theory and practice of cultivating the earth under the instruction of well qualified teachers, and from whence they may return to their paternal acres, fitted to make the agriculture of New England what it should be, and what it must be.

I have great confidence, gentlemen, in New England agriculture. I know it has given us a race of men whose firmness and virtue and love of country have made our nation what it is. I know that in their keeping have rested the sacred rights which our fathers brought to this continent, and established with their blood. I know they are good citizens, and that they have sent abroad over this Union, the energy and wisdom which have added State after State to our confederation, inspired with loyalty to a free constitution. I find their sons exploring the dark passages of our western mountains, opening new paths for civilization. I find them navigating our rivers and lakes, conducting our railroads, teaching our schools, filling our pulpits, building new cities, and carrying New England habits to the far off shores of the Pacific. I find them tossed on the stormy sea of fortune, sharing its reverses and successes with courage, hope, and energy undismayed, turning their eyes amidst all the vicissitudes to the "home of their fathers," which stands ever ready to "welcome them back."

And more than all, I know that these high qualities of energy, prudence and courage, when applied to their native soil, may make our own land richer far than any hidden wealth in virgin valleys. For it is for themselves that these farms furnish an industrious, hardy and intelligent population, in whose hands rests the great interest which has called us together to-day, and which we should never neglect. I would have our young men remember that while the glittering prize would tempt them away, there remain behind the sure rewards of patient industry. I would remind them of the comforts and refinements of New England, of the lands lying here waiting for cultivation, of the wealth which will flow in upon us when we devote ourselves to our own soil, and of the peaceful and happy lives to be led in a moral, religious and well educated community. I say I have confidence in New England farming; for I see what our people have already done, and I know what they may do, when, guided by a well-ordered agricultural education, they apply their industry to the cultivation of these fields, and teach their children that a New England farmer may be more than contented with his lot, and that intelligent New England labor is sure of its reward.

THE USE OF MIND IN FARMING.

From an Address before the Worcester South Agricultural Society.

BY T. T. WATERMAN.

Cultivated mind, gentlemen, speak of it adversely as some may, through ignorance or prejudice accounting it of small significancy, stands first as a power on the land and on the sea, to the student, the statesman, the professional man, and, as certainly, to the mechanic, the day laborer, and the farmer. To do a thing well, the actor must know how it should be done. This is equally true of all departments of industrial labor, of the plough as of the quadrant, the spade as the telescope, the hoe as the pen, in the corn-field, as in the chemical laboratory. Ignorance and idiocy are no more honored, when acting in agriculture, than in navigation or astronomy. If ignorant, and thus incapable of judging correctly of instrumentalities and of their just relations, a man, no matter in what division of labor he acts, no matter what cloth he wears or how much he struts, is weak and worthless. He might possibly answer for a scare-crow; though it is probable that even the black-wings would outwit him and steal his corn. Such a man, at best, can act only on uncertain, and it may be perilous experiment. Not knowing what he ought to do, or how to do what he attempts; neither he, nor any one else, can tell what he will do.

All this is eminently significant on the farm. The great purpose of farming is to furnish means of sustenance, and joy to man and beast. Of course, upon success here, success in all things else of flesh, bone and blood on the earth is suspended. Let the wisdom and toil of the farmer cease, let his wagon not go to market, and the fools of fashion and lords of genteel swell in Broadway and Washington Streets, would soon cry for help. Verily, are kings and nobles fed by the spade, pruning knife

and plough. To these, and to the men who know how to wield them, are they, with their haughty pre-eminence, in hopeless subjection.

Let us not misapprehend, gentlemen: in practical farming there is a vast demand for the use of the mind. Here all natural agencies and instrumentalities meet and act. Nature as a whole is the means; its action, endlessly diversified and complex, is to be rendered the source of profit. What a demand for practical knowledge, or effective use of mind, is here. The heavens above, sun, moon and stars, vapor, dew, heat, cold, wind, rain, frost, ice and snow, all—favorably or adversely—act upon and affect the labor and hopes of him who plants the corn, sows the wheat, and tends the flock. Of all these influences such a man is to know and judge. And can he do this, wisely and well, without deep and critical thought? As soon traverse oceans, survey continents, or determine the distances of the fixed stars, without such thought. Nothing but well adjusted mind can safely tell when and how to prepare the ground, sow the seed, mow the grass, cut the grain, prune the vine, or trim the tree.

In all this, mind is to be used; and to be used well, it must be informed. No other agency, gentlemen, can surely inform and safely guide amid the various and oft-times conflicting influences which, on the farm, are so mighty to act, and so certain to control. Understood, these influences become strength and joy; misunderstood, they work a work of ruin. By close observation of natural laws, indicated by varying and yet uniform manifestations, and this in the detail of daily experience, the successful farmer learns and applies lessons of wisdom and strength. The manual, from which he derives his best instruction, is composed of suns, moons and stars; of vapors, clouds and dews; of storms, winds and hail; of moisture, drought, heat and cold; yea of all in the heavens above: making them all contributors to the better growth of his broad and glorious empire of grass, of fruit, and of stock.

Thus, studying nature, the farmer becomes, practically, a natural philosopher. Upon given indications of vapor, or the sky, or the wind, at sunrise, at noon, at sundown or midnight, in seed or harvest time, may the success or failure of an entire summer's campaign on the farm depend. A mistake in inter-

preting these slight and misty messengers, but recently, on a noble farm, was disastrous to the almost total loss of hay and grain in harvesting. On an adjacent farm, and under a more close and shrewd observance of natural laws, the whole crop was secured with scarce a farthing's loss by wet, fermentation, or mildew.

In these instances, things above and around were the same. The difference was in the use of mind. One did not closely study, or studying did not understand, and hence acted at random and lost his crop. The other studied, understood and obeyed nature's laws, and was blessed. Superficial observers and glib-tongued critics—and they are not scarce articles—looking on the mildewed heaps in one case, would doubtless, with doleful emphasis exclaim, "unlucky! always unlucky!" And turning their eyes over upon the bright and golden heaps of the other, sing forth, "lucky! always lucky!" Now, gentlemen, what a mistake this about luck. The secret of the whole affair was in the kind of attention the one gave, and the other did not give, to the exigencies of the case. When will men be persuaded to suffer luck, in the calculations and labors of life, to pass for just what it is, nothing? There is no haphazard, no game of chance, no wizard or departed spirit juggling, in raising and harvesting a large crop of corn, hay and wheat, or in fattening a large herd of swine or cattle. Whatever may be in other departments, we have yet to learn the existence of ploughing, mowing, reaping or threshing mediums!

Nature in her sunlight, clouds, rain and heat, will not stop to play hide-and-go-seek, or ride-and-tie, with an ignoramus, a fool, or a stand-still. Like time, on she ever rolls, and regards the will of no man. It is not her business to fawn and flatter, and flirt, with such as belie her counsel and make void her mandates. She pays no sycophantic compliments, bows before no titled dignitaries, allows no privileges to gentlemen of renown or to honorary members of agricultural associations.

To be successful, the farmer must think and work. He must observe and obey natural laws. He must, by practical study, become a living thermometer, barometer, electrometer, hydrometer, patent wind and weather gauge, electrical, magnetic, galvanic, terrestrial and celestial, universal calculator. Such an instrument can be made only of mind, strong mind; and

when it is made it is worth its cost. Gentlemen, we believe it impossible to compute the amount, or the worth, of the practical physical science which a wise farmer acquires and uses in sending up to joyful productiveness his kingdom of earth, water, sod, stone and tree. Such men are walking folios. They are exhaustless cyclopedias of available information in plough-ology, hoe-ology, corn-ology, barn-ology, fowl-ology, husk-ology, stock-ology, haw-ology and gee-ology. They are practically, and thus really, the graduates of and the professors in the great University of natural science, and have the honorary degree, LL. D.—Lords of Land and Digging! The college they enter and honor is one in which problems are solved, not by pen and blackboard, logarithms and algebraic signs, but by a personal use of the axe, the hoe, the yoke, the plough, the scythe and the flail. These problems are unsurpassed in reach of influence and importance of effect in the records of man's varied and vast intellectual achievements. They themselves may not so think or so intend; but, gentlemen, so it is, and so it must ever be. The true farmer is, and must ever be, a profound natural philosopher, the author of monthlies, quarterlies and annuals, the articles of which are the most substantial and tasteful which ever lie upon our tables. Of all other productions, these of the farmer are the most surely in demand, the most eagerly devoured, and the most effectively digested. To these productions not a few of the mighty in science, literature and the arts, delight to do homage, finding, like the O. W. H. Autocrat of the Breakfast Table, in eatology, their "chief end," their most profound satisfaction. True, such farmers may never own or read Bacon's Essays, but what is better, they essay bacon itself. They may not study the natural resources or productions of Turkey, but they can and do furnish turkey as a production and resource.

Thus the farmer is a philosopher, who, by his works, sustains all other philosophers, and without whose mind and labor and productions, physical existence, and with it mind itself, must fly the earth. As important, therefore, as are all the arts and sciences, in the higher developments of civilized and Christian man, just as important is it that the minds of agriculturists task themselves in the attainment and use of knowledge. Thus only can they, with the blessing of God, render nature mighty,

to produce and make glad a world-wide humanity. Let every such man gird up his soul and study the entire outward world. From early boyhood to mature manhood, and ever, he has a free ticket to the library of creation. In that there is no top shelf, no last volume. There let him read, investigate and judge of all influences, relations and effects. Let him analyze and classify what he learns, as data upon which to base conclusions, which shall be as abiding laws to himself, those around, and to all who shall come after him. Thus will he help on the higher perfection of his heaven-appointed and God-exalting avocation. He himself may die, and the green grass and wild flowers may wave in silence and beauty over his grave, but the fields he has cleared, the fountains he has opened, the trees he has planted, the homestead he has beautified, will live. More eloquent than pyramid of granite, or sculptured marble, they will speak his praise.

In all this, gentlemen, reference has been made merely to the outward or astronomical influences which affect the farmer's toil. This field of inquiry is vastly important. The most able agriculturist may here tax his powers; from one stand point he may pass to another, and from that to yet another, only to find valuable knowledge spreading before him. As he advances he will perceive more and more to be attained, each attainment rendering what has been attained more and more valuable, and what is yet to be acquired, more sublimely interesting and effective.

The use of mind in farming does by no means stop here. The accomplished tiller of the earth has, if possible, a more intricate and endless field for inquiry, in the internal and surface elements—chemical, mineral and botanical—which influence his labors. In their wonderful complexity and mysteriousness of influence, as affecting, propitiously or otherwise, the growth of vegetables, grain, fruit, shrubs, trees, flowers and animals, he is to study and know these invisible yet palpable agencies. Tell, who can, the geological, mineralogical, ornithological, conchological, topographical, chemical, botanical, and electrical influences which combine to help or destroy the successful cultivation of a single crop. These influences are around and with the farmer every time he plants, hoes, ploughs or reaps; every time he selects his seed, his fruit, his fowls and his stock. Of

these things he must know and must judge, and, right or wrong, so must he win or lose.

Sixty-two elements, it is computed, enter into the formation of our globe. Of these forty-five are mineral. The combinations and influences of which these elements are capable, are limitless. What one combination will strengthen, another will counteract, and what, in animal or vegetable growth, one will promote, another will destroy. By these different combinations and influences, one soil is made to differ from another, and one species of grain and fruit has this character, and another that. By this, too, composts, and the modes of applying them, vary. On these depend other diversities, as those of preparing the ground, ploughing and sub-ploughing, draining and under-draining, time of sowing, and of reaping, and garnering, and the like, which rise in the ratio of compound multiplication, each diversity being ever fixed and effective. What an involution upon involution of agents and influences, means and ends, is here presented to the use of mind! A chaos, it might seem, made by chaos more chaotic, defying alike and forever all analysis, distinction or classification.

But notice, gentlemen, in all this diverse diversity of elements and of combinations of influence, law, as in all things else of God's ordaining, reigns. Law, which is sure and far-reaching, as that which guides the rain-drop in its fall, the eagle in its flight, and worlds in their orbits. Law, which every blade of grass, leaf of tree, kernel of wheat, corn and rye, flower, shrub, berry and fruit obeys, and obeying becomes itself. Distinctiveness of species comes by obedience to law, which, acting, regulates the chaos of diversities, and from the same draws forth the endless variety in the productions of this teeming earth. By this obedience to law, amid all this internal and external surface action of antagonistical agencies, it happens that all is harmony and peace, sunlight and love, over the habitable world. In his use of mind, man goes out and comes in, sows and reaps, plucks the flower and the fruit, fattens his flocks and his herds, and, amid golden harvests and autumn's smiling day, brings in his sheaves and sends up his exultant thanksgivings unto the God of goodness and of love.

Wonderful, and often unappreciated, is the knowledge which the successful farmer, by daily study, gains of these surface

influences, as they act in the great and momentous processes of vegetable and animal growth. His use of mind here is his strength, yea, his fortune. He may not know that he knows this, and scientifically he may not know it, but he does, nevertheless, practically know and work it all up into real and beautiful result. His education, in the midst of these great surface elements, is imperceptibly but really progressive. Crude it may be in the form, but mighty in the power of its expression. In silent but eloquent tones it speaks in the luxuriant meadow, the waving fields of golden-headed wheat, in acres of noble-stalked and long-eared corn, in splendid shade trees, fruits and flowers and flocks. He composes essays, not by measurement of a tiny sheet of foolscap, but by the acre. Essays written, not by pen, ink or type, but on the solid earth, by plough, crowbar and axe; essays which are literal "life thoughts."

Thus, and in wise necessity arranged by a beneficent all-directing Providence, the farmer is self-educated. His mind is used in his work, and thus by his work is he educated. Holding fellowship with the earth, he knows the earth and the things thereof. Were not this so, the cultivation of nature, only as it sinks degraded and forlorn among Hottentots, Arabs, or savage tribes, would cease. But most happily, gentlemen, is it true, that laws, principles and influences may be learned practically and effectively by him who carefully and well works upon the materials which those laws and principles govern. The farmer is thus literally a scholar by his work, learning lessons taught in the great out-door temple, or blue sky panoplied and green-sodded free school of this ever beautiful world.

Look at this law of educational farming in its actual being. A farmer experiments in sub-ploughing and draining. He learns that as the soil is deepened, the effect of manure is increased; the season of working it is prolonged, and the effects of drought prevented. By experiment he learns all this, and therefore knows it. The science of the same he may not know, nor, in one sense, does he need it. The use of the science and the effect of it are his. The gentleman agriculturist takes his facts and explains them. Water, he says, is held in the soil between the minute particles of earth. If these particles be compressed, there is no space left for the water. Hence hard or compact soils are little affected by water, compared with

the same as broken up deeply, pulverized and mellowed. Unbroken and undrained soil becomes compact after heavy rains, by evaporation of the water; broken and drained soils become more porous by the filtration of the water into the drains below. Thus a crop planted on a side hill, and underdrained, flourishes best in a drouth. All this the shrewd farmer knows. The scientific reason is that water is a large portion of the air, and this in the dryest time. By under-draining, the air comes in contact with the cool earth beneath the surface, and is instantly condensed, and is thus absorbed by the earth, and so waters or fertilizes the crop. By this process the air is brought in constant contact with the soil, and supports its surface vegetation. On this principle learn the secret why hoeing and ploughing benefit a crop. The loosening and pulverizing the soil permits the air to enter and deposit its moisture, and thus gives strength and growth.

A farmer knows, moreover, that plaster of Paris sown on his grounds, or placed in the hills of his potatoes and corn, promotes their growth, and that powdered charcoal does the same. He has tried and knows it. Thus he has the fact without the philosophy; he works the fact and gets the crop. The scientific man says, in explanation, that plaster and charcoal are great absorbents of ammonia, the greatest, if not only furnisher of nitrogen, the great sustainer of vegetation. This is derived, by plants, through their roots and from the earth. Plaster and charcoal being supplied, take and hold, and furnish to the plant the ammonia or its nitrogen. Plants, as is affirmed, and the fact is as incomprehensible as it is fortunate for us, never take nitrogen by their leaves from the common air, but from the earth by their roots. Were the opposite true, the nitrogen or essential element of the air and of animal life, would be absorbed by the immense vegetable action in the field and forest, and thus the life of the vegetable would be death to animal existence. And as singular is it, and wonderfully does it magnify the wisdom and power of the Almighty and intelligent First Cause, or God, that plants derive carbon, an essential element of their growth, from the common air, through their leaves, absorbing it and thus purifying the air, relieving it of the mightiest agent of destruction to animal life and combustion; and all this while animal life is constantly generating it. Thus animal life gives

what is deadly to itself, and vegetable life absorbs the same and thrives.

How sublimely expressive are such laws of the glorious wisdom of Him who has hung the world on nothing, and who whirls suns and stars and systems of stars in orbits of millions of miles, and with lightning speed, through boundless space! An undevout astronomer, it has been said, is mad; what then is an undevout tiller of the earth, the owner and operator of this bountiful New England soil? The farmer may, if he will, profit by the suggestions of science and philosophy, but, after all, he must depend more upon what he works out, in home-spun dress and with bony arm, dusty brow and treble-skinned hand, in his own wide studio of hill and valley, meadow and corn-field, wood-land and orchard, barn-yard and hay-stack, horse and cattle stall, poultry and pig yard. In this, his own school, with shovel, pitchfork, flail, trace-chain, whiffletree, ring and bolt, wagon, cart, oxen, horses, cut-feed, oats, corn and hay, he can and must work his science out. He must prove its truth and power by what he actually produces. Corn fifty bushels, wheat thirty, potatoes two hundred, hay from three to four tons per acre; eggs, apples, butter, cheese, wool, honey, pork, beef, and articles too numerous to mention, in large supplies, are the best demonstrations of success. Science or no science, books or no books, the great practical lesson is gained; I eat, you eat, he eats, we eat, ye or you eat, they eat!

All this is practical education, the use of mind cast upon its own resources and reading facts as they are revealed in actual experiment. This is a work which requires, and must have, clear and strong mind. Nothing idiotic, or below par, will succeed in such a school. The A. B. C. of farming is acquired only by mighty, continuous effort. Let imbeciles, exquisites and fools, with their white gloves, choose any other profession, if they would thrive, than that of tilling the earth. Common sense, sound judgment, correct estimates of wind and weather, seed and soil, must be on the farm if the farm flourish. Good crops are not and cannot be guessed, whistled, or laughed out. Never! and the wise farmer knows it. A farmer may whistle, and whistle well, and let him, if he pleases, so do, but whistling will not raise corn or feed cattle. Work, under the guidance of a well-trained and used mind, is the element of

beauty and strength on the farm. That speaks when all else is silent. Every sound agriculturist knows that if he has a good crop he must have, as he himself is concerned, three things:—

First—Good and well prepared ground.

Second—Good seed.

Third—Good tillage.

These must be guarded and guided by wise calculation and prompt action.

What a power has the use of mind in farming been, for two hundred and thirty-nine years, amid the hills and valleys, rivers and lakes, rocks and trees of this our heaven-blessed New England. Tell the amount of labor here expended in gathering stones, felling trees, ploughing, planting, reaping, building, shading, enriching and beautifying this our rugged, rock-based, stone-sprinkled soil! As well tell the number of rain-drops that have here fallen, or the buds that have here opened in forest and orchard, or the waves that from old ocean have rolled and broken upon Plymouth's shore! This untold amount of labor, performed by male and female mind and hands, under heaven's smiles, has been the great sustaining power of our successes in the past, and of our blessings in the present. Be assured, Mr. President and members of this association, that in the year 1720 it was written and published in England thus of New England: "It is the unhappiness of the country to have no staple commodity to export to England, while they import hence all their cloths, woollens, silks, hats, linen, calico, iron ware, tools, knives, scissors, nails, and the like. As things are, New England must be poor. Having nothing to sell, it can have nothing with which to buy. There is hardly coin of silver or gold enough for the retail business! Thus it will be impossible for the country to subsist of itself for some CENTURIES to come!" The advice given to our fathers was to remain quiet, and, as dutiful children, merit any favors the crown might see fit to grant. Are such statements to us now matters of mirth? Yes, we smile, and we do well. But as we smile, let us remember the toil on the land, in the shop, in the school, in the pulpit, in the forum: toil amid dangers and privations, battle and bloodshed, that has made logical calculations false, and even mathematical demonstrations void. Why, gentlemen, only so far behind us as 1750, the erection of any mill, engine, forge, trip-

hammer or furnace, was prohibited by solemn act of parliament; penalty, £200, or one thousand dollars, for each offence.

Such, in poverty and oppression of royal prerogative, was our endeared New England one hundred years ago! And what is New England to-day? What her wealth, her freedom, and her power? What has the spirit of her sons and daughters, at the plough, the distaff, the hoe, the churn, the anvil, the loom, the Primer and the Bible, in the name of Israel's God and His Christ, here wrought? What deep thought, dauntless courage, indomitable enterprise and holy love have been here? What noble-hearted and strong-handed men and women have prayed, and wept, and toiled, and died, and in silence and glory sleep amid these valleys and hill-sides? Behold our cities, towns, villages, farms, shops, furnaces, forges, factories, warehouses, shipyards, railroads, steamers, whaling vessels, banks, school-houses, colleges and sanctuaries, all keeping time with the ceaseless anthem of our waterfalls, anvils, looms, spindles, axes, planes, hammers and saws, as they sing—Work! work! work!

Look at all this and tell me, if with her 10,550,594 acres of cultivated surface, and her $12,937,290 worth of farming utensils, and her some 200,000 strong-handed and intelligent sons to use them, New England cannot support herself!

"THE FARMER, AS HE WAS, IS, AND IS TO BE."

From an Address delivered before the Hampden East Society, October 5, 1859.

BY E. W. B. CANNING.

Geologists tell us of a transition period in cosmogony, when the primitive rocks of the world changed their form, and constituted a stratum between the amorphic mass beneath, and the more perfect development forming the upper crust and surface of our globe. The great back-bone of the earth having been laid beneath the deep foundation of the hills, the ribs and skeleton limbs must next be positioned, preparatory to the clothing of the whole with the beautiful covering constituting the superficial world. Methinks the farmer of the present day occupies this transition place in the development of agricultural science. He has broken the trammels of antiquity; the blind and erring attachment to the past; but has not reached the eminence his children's children are yet to attain.

Greatly, in later years, has the prominent bump of *constructiveness* in American craniology been tasked in aid of husbandry. Almost every implement of the art has been perfected, and a vast number invented, to assist or save manual labor. As instances of the latter kind, may be named the various mowers and reapers—the introductions of recent date, whereby whole sections of grass and grain are harvested with less time and trouble than were, on the old method, as many acres. Not content with these achievements, men are now perfecting a steam-plough, and such a machine may be in general use before aërial navigation is wholly successful. The cumbrous utensils of the past are fast disappearing before the lighter and apter contrivances which secure desirable results with a vastly less outlay of time and strength.

To the advent of such a day, I have no doubt, the rivalry of such occasions as the present has largely contributed, and here

we may note one great benefit of our agricultural exhibitions. Science, too, has lent most important aid in this behalf. Chemistry has been made tributary to geoponics; and although every farmer cannot have his laboratory and analyze for himself, yet the results of such analyses by others are within his reach, and he has begun to avail himself of them. With the practical helps furnished by such men as Liebig and Mapes, soils, heretofore regarded as worthless, have been made to wear the garb of Eden, and a method developed whereby the fertilizing properties of various substances may be indefinitely increased. Millions of actual value have thus been added of late to our national wealth, and the necessity of emigration from the older States to the more productive West, in a great measure obviated.

I am no believer in the efficacy of theory, or of practice, operating independently of each other. Book-knowledge alone will never produce bread and butter; and manual labor, undirected by knowledge, is blind and lame. It is Hercules with his lion-skin and club; his brawny arms and sinewy limbs; but Hercules an idiot. It is Prometheus, with the proportions of a giant—but Prometheus *bound*. Only the union of both, giving to each its proper bearing, will accomplish the desideratum. Let Science furnish the mind and Labor the muscle; let the latter hold the plough which the former drives, and wonders may be witnessed. These two mutual helps should never be dissevered, or the position of either underrated. In practical operation, each needs the checks and corrections suggested by the other. They are mutual debtors, and a dissolution of copartnership would bankrupt both.

A proper appreciation of this fact has prompted the movements made in various States of our Union, toward the establishment of agricultural schools, in which the farmer-student may be educated as thoroughly and specifically for *his* avocation, as is the aspirant of law, physic, or divinity, for *his*. The utility of such projects it remains for the next generation to prove; but from our stand-point, the eye of faith can easily foresee it; the farmer that *is-to-be* will realize it. But the scattered grains of knowledge which have fallen for the last few years upon *some* furrows of genial mind, have already sprung up, and are blossoming for a hopeful maturity. * * * * *

The farmer of the present time is noticeable as coupling with the weightier works of his profession an idea of the tasteful and beautiful, to an extent far beyond his predecessors. This may be seen in the architecture of his buildings; the paint that covers them; the trees and shrubbery that shade them, and the grounds that surround them. The barns of many a man in our Commonwealth are better than the house in which he was born, and his good father died. He has come to consider it more respectable as well as pleasant, to look from his front door upon the highway and his fields beyond, beneath a row of maples or elms which woo the breeze and splinter the sunbeam, than formerly, when the broad lawn lay unshaded and shimmering in the heat of noon.

Moreover, his front prospect has been greatly improved by the removal to the rear, of the barns, sheds, and manure heaps, that once constituted the frontispiece of the view from his parlor windows; and a tidy, gravelled walk, bordered by heliotropes, verbenas and geraniums, conducts the visitor to the entrance beneath the honeysuckle and the woodbine. He feels a conscious pride, as he walks among the well-pruned and duly nursed trees of his fruit-yard, whose grateful burden welcomes his gaze and gratifies his palate. Nor is it at all disagreeable, when his day's work is over, to feed his imagination with the prospect of many barrels of the choicest products of his grafted orchard, whose presence in market is to tempt the townsman's pockets and line his own. The stumps and stone-heaps that scarred and sprinkled his meadows, have yielded to the purifying influences of his taste, and the broad, smooth green of his grass-lands offers now no obstruction to the clean sweep of the scythe. That swamp, so scrupulously shunned by his ancestors, offends the eye no longer; its dead-sunken hemlocks and mazes of undergrowth have capitulated to the axe, the bog-hoe, and the fire; and an efficient drain has showed its stagnant waters a decent way out of the premises into a neighboring stream. The ancient, rickety stone walls of the farm are righted up, plumbed, and largely reinforced by boulders from the surface ground adjoining. In short, wherever the nature of a work naturally rude will admit an approximation of smoother touches, they are bestowed, and even an extra finish occasionally volunteered, as in case of a beautiful bird-house that overlooks his garden,

inviting martins and blue-birds to housekeeping and bug-breakfasts off his vines.

The interior arrangements of his household wear the same look toward perfection. The modern appliances in aid of dairy labor and women's work in general, are being introduced. Well and cistern water and fuel are reached under cover, and the whole establishment, within and without, for convenience, adaptation and completeness, answers well the idea conveyed in the good old Saxon words, snug and home-like. While greater attention is paid to the comfortable quarters of the stock in the stalls, the necessity of enlarged education is acknowledged and honored in the mansion, and book-case and parlor bear witness that the ornamental as well as useful branches of study are not unknown in the family.

But in one respect, the survivor of a former generation, who should call at our present homes, might sigh over the change from olden time. That air-tight stove, those carpeted rooms, those prim young men and maidens, and that sedate game of whist, would, in the aged visitors' estimation, by no means recompense the scenes of Thanksgiving eve in the old homestead; when the blazing logs in the ample chimney shone ruddily upon the scrubbed floor, and crackled joyously in unison with the laugh of a score of kindred and friends, young and old, who rationally rioted with the old fashioned games of "Blind man's buff" and "Hunt the slipper." The sweetest airs from "Norma" upon the piano might only awaken regret that the days "lang syne," when with joined hands the merry circle sang—"We won't go home till morning," have passed away; and that choice refection of sherbet and scolloped oysters but revive the longing remembrance of home-brew and cider which washed down the nuts and cider of long ago. Ah! there were "creature comforts" *then*, too;—have modern bees made sweeter honey than stored the hives of former time?

To conclude this topic of our general subject, a Rip Van Winkle view of the farmer of fifty years since and him of the present day, would indorse such *progress*, both in appearance and reality, that, with all our predilections for antiquity, and our ideal picture of its Utopian simplicity and comfort, we should be loath to make the retrograde exchange.

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PROGRESS OF FARMING.

From an Address before the Housatonic Agricultural Society.

BY HENRY W. BISHOP.

In their new companionship, labor and knowledge will mutually aid and amuse each other. The workman will be a geologist; his mattock, a hammer; the cornfield, a laboratory; and he who folds and feeds, as curious to know of organisms and their functions, as he who cuts to cure them. The old fears and superstitions have not vexed and checked the march of these new sciences. The first alarmed, but not much—the old interpreters of Genesis. The others were slightly suspected of material proclivities. Honest inquiry did its appropriate work, and the heralds of science and the heralds of salvation, though in province apart, find these truths in harmony, and converging to the same fountain of power and wisdom and love; collision is succeeded by concurrent effort for the same end—a higher civilization—a better condition of soul, body and estate.

With this coöperation of will and way, of head, heart, and hands, is there any thing to check progression, except the perplexities incident to all investigation? Examine in *detail* the discoveries and the changes wrought by them, and it will be apparent that this department of the science of nature, in rapidity of development, and variety of application, has been outstripped by no other. Where it touches, it electrifies, extending the boundaries of knowledge, and the range of industry. Carbon, in its connection with growth and fertility, is a subject for both ploughman and grazier. It enters into the structure of the grasses and the cereals, and all that live upon them. If it was formerly known as a constituent, the conditions fitting it for the animal and vegetable tissues were not. The air was supposed an element, and the *only* permanently elastic fluid, mingling with itself, by chance, substances as light as, or lighter than, its own. This was considered to

be as well established in nature as that 4 is the square of 2 in numbers. The doctrine was more than 2,000 years old, and found in the creed of every naturalist who treated of the atmosphere.

There are those now living who were present at the experiments of Professor Black, of Edinburg, upon lime and charcoal, and saw the processes by which the air, then called fixed air, was brought out and shown to be a permanently elastic fluid, and in connection with other airs, went to make up the atmosphere. Thus the notions,—that the air was a simple and the only fluid permanently elastic, although they were old as the world, and had received the forms and sanctions of a scientific proposition,—were exploded in an hour. Experiments, suggested by an acquaintance with the constituents of vegetables, their composition and organs of growth, proved that the aeriform state of carbon, and other constituent substances, was one of the conditions of vegetation. Multiplied experiments wrought multiplied *revelations* and revolutions in practice. The gas family became numerous, respectable, and very useful. Fertilizing substances innumerable were found readily susceptible of conversion to that form and many unavailable in any other.

One discovery, where the relations are many and involved, always has wrapped up in it the germs of a thousand more, and agriculture is gathering the harvests that come of them. The relative partialities, which the material elements have for each other, and the strength of those partialities, are not among the small discoveries of modern naturalists. They have intimate relations to health, as well as production. Nitrogen, fatal when free, entering largely into vegetation at maturing; ammonia, volatile and offensive, but without a peer among the fertilizers, if the books tell the truth; can through their affinities, be *gathered*, stored, and kept for use, by gypsum, muck, and other very common substances, which absorb and retain them.

These mutual affinities cannot be overvalued. They are as available for life and health as for fertility. They do the unclean work of scavengers—purify our surroundings—catch and fix the exhalations—offensive and pestiferous, unavoidably rising from the precincts of the mansion and yard, and turn

the elements of putrefaction into the aliments of health and growth. The theory of combustion, placed by experiment beyond all controversy, has disclosed new and important bearings, which heat has in the economy of life and health and growth, and its agencies in the changes and mutations, which the earth's surface and all things on it, are constantly undergoing, how and why it keeps the living organs together, how and why it dissolves them.

The geologist says—and those who lived before he had a name never controverted it—that the basis of the soil is mineral, made of rocks, (which he has described and named,) crumbled by the incessant activity of heat, moisture, frost, and other penetrative agents around and within them. Although these operations may not have been detected, their effects were known, as long ago as soils were divided into calcareous, sandy and clayey, as lime, sand or clay, happened to prevail, and in the like exposures and climates, the bearings of the various proportions in their mechanical mixtures, upon the production of the different grains, were known; still they were looked upon as an anchor-ground of the roots rather than as subserving other purposes, and aside from improving physical texture, the parts they took in the processes of vegetation, were ill conceived, if at all understood. That they entered into the composition of vegetable structure and became parts of the living tissues, would have been thought a strange perversion of the nature of things. Analysis, however, has detected in herbs most of the minerals in the soil on which they grow. They polish the corn-stalk; stiffen and gloss the wheat-stem; incrust and glaze the cane. That their presence hastened development and maturity was well known. How it was done was a matter of speculation. They are spoken of in old treatises as stimulants to the roots, and starting into activity dormant fertilizers—rarely as the proper food of plants.

How plaster of Paris operates is a topic which has been earnestly and learnedly discussed within the memory of all of us. The better opinion seemed to be that it drew moisture from the air, and acted as a condiment in preparing nutritious matters and exciting vegetation. That it may thus act is not unlikely. Nature in her economy uses the same thing in various ways and for various ends. The problem, however,

was in a measure solved when Davy chemically took to pieces the plants it made grow, and found gypsum in them; and subsequent experiment ascertained that it had no appreciable effect on plants in which it was not found, and none, in which it was found, where the soil had enough of free calcareous matter in it before.

Researches into the nature, constitution and final causes of what is upon the earth's surface, where we live and work, have resulted in capital discoveries, because conducted upon philosophical principles. Sound senses are thought to be trustworthy, when cautiously and honestly used by a sane understanding. Trusting to them, men have experimented, noticed, recorded, collated and generalized facts. Honest searchers have become severely studious, to find out the qualities and properties—simple and combined—of the material things with which kind Heaven has associated them, and what those things were made for. Natural phenomena have been taken from the custody of alchemy, astrology, and natural magic, and passed to the truth-telling philosophy of nature. War, with its arts, as a path of gain and glory is for the few. The profits of the professions, called learned, are not for the multitude. Few have leisure—fewer taste, for the merely speculative and absolute. Students of nature are neither limited in number, disheartened by competition, embittered by envy, nor bewildered by fanciful abstractions. Such student has no strategy to practice, no specific to hide, no technical traps to spring, no old dogmas to defend. He deals with the fact and its *law*, and through the law he can foresee and predict the fact, if as conversant with the law as he who knows the path and speed of Venus, can tell where to find her.

The application of these discoveries to the material interests of civilization, of which the cultivation of the earth is most prominent, wide-spread and useful, has all along been steady and progressive, and given the dignity of science to occupations, thought to need little else than strong muscles and practiced hands. They have opened a wider sphere for intellectual activity than was once thought possible, for some have broken out too suddenly for anticipation. A widely diffuse literature, as alluring and instructive, as exact thought and novel revelations can make it, embodies them. Who now so obtuse as not

to have perceived that the men of the pulpit, the bar and the healing art, have lost relatively their altitude, not by depression, but by the elevation of the plane on which the cultivator stands, full up to the lines of their own. Upon this plane, thus lifted up, stand men, fond and proud of their vocation, of large attainments, clear views, living not in or for the past, but for the present and the future, who will pass over to the future all the *real* knowledge of the past, and suppress its follies—who like Boyle and Bacon know the importance of individual experiments and the fallacy of assuming as true the facts, in their lines of inquiry, that antiquity has passed down.

So much of the supernatural has in the past been associated with the facts and events of agriculture, and so little confidence have those engaged in it had in their own resources, that aside from certain maxims which experience necessarily enforces, really nothing of scientific value has come down to us. Nor is it wonderful. Their superstitions were insuperable bars to progress. While one divinity had charge of the winds and the storms, frosts came at the bidding of another; another breathed pestilence and mildew, and the harvests were at the caprice of still another; and even while the weather was thought the medium through which the sole Supreme showed his indignation and inflicted his judgments, it would be unreasonable—a sin indeed—to be hunting after order and its causes, and be an atheist, who could find in events no specialities, and should look behind them for some fixed and general appointments.

In this, Christian inquirers of the present day concur, that the records of the real, made by pagan or any other superstition, are no more worthy of credit than the opinions and speculations they contain. In agriculture especially it is to the record of fact and principle that those of us are to look who care for the present and the future. And what a field does this record of them open! Its length and breadth are the world's cultivable area; its subjects exhaustless as the properties, the possible forms and combinations of matter, and the purposes for which God made them. It is a field for the speculative and contemplative, as well as the practical; for the cultivator of the science of growth and the cultivating grower. Where else can labor find for its toil richer rewards; for its pastime purer pleasures, or healthier recreations? Since the

volume of nature has been conned, analyzed, and found to be not a confused and fortuitous compilation, edited by chance, but a profound system of truths, interlaced and mutually dependent, it is no wonder that the old programmes of education are being sharply criticized—that Johnston's Chemistry of Common Life, Liebig's Physiology of Plants, and general works on agriculture are supplanting treatises on dialectics, metaphysics, and their congeners, about which, if the world ever knew any thing, it knows little now, and cares less.

The study for the periods prescribed of a dead literature, from which no knowledge is gleaned which cannot be had cheaper and easier elsewhere—save perhaps of hard terms through a knowledge of their roots, is by many sensible men boldly censured. If the systems of education be faulty, the masses will correct them. The masses that till the ground are never retrogressive. The vox populi is always heard ahead. Learned professors, if good ones, are wedded to their schools, as monks to their rituals, and yield reluctantly to the displacement of what they teach and defend. It is claimed that the principles of the arts of husbandry have been thus far pretty accurately defined and classified. If errors there be, they will suggest themselves. The natural will correct the arbitrary.

When the principles of an art extensively practiced begin to unfold themselves, the tendency to generalize is irrepressible. Rules multiply, and no deep thinker is content to use them without knowing their philosophy. With *him* kindred facts, carefully noticed, classify themselves, and induction comes of its own accord.

An occupation—the basis of material prosperity, possessing the charms of art and the majesty of science, cannot fail to attract to it the busiest intellects and the warmest hearts, and attain the social weight and sway which knowledge never fails to impart to the vocations which employ it. And among the revolutions in this direction, which that restless revolutionist—the popular mind—is constantly making, those in agriculture will lead to the most general, beneficial and lasting results. They will multiply the temperate, rational wants, and the means to meet them. A luxury becomes a necessity, and the necessity the prolific mother of inventions for its gratification and supply. What better range can the brain take for health-

ful activities than the range of the fields? Where find fitter aliments of vigor and enlargement? Where richer furniture? Where the excitements of happier emotions? Where the topics of purer and loftier thoughts?

Well founded are the arguments of a learned divine, drawn from man's alienation from nature in proof of the fall, and sound was he, philosophically, if not theologically, when he pronounced a scientific knowledge of her, an efficient auxiliary to restoration. Who examines her and meets not the foot-prints of the Creator, not only among the rocks, as did the keen-eyed Miller, but in the garden, the grain-field, the meadows, the pasture, the forest-foliage. Who sees not God in the clouds—does not hear him in the wind? Not the untutored Indian's god of dark visions and unintelligible utterances: but the Christian's God, conspicuous and vocal in the ordinations of His wisdom.

It may be claimed that leisure is necessary to the investigations suggested. It is conceded that leisure comes of wealth only. It may be so, where the calls and professions of fashionable life make excessive drafts on time and income. Few only most certainly have leisure to pursue them indefinitely, but many to a liberal and more to a limited extent; and in these days there are very few intelligent cultivators who are without the elements to start with. The means and facilities for trying expensive and doubtful experiments are confined to the few. All can read the records of their trial. Few only may generalize, or care to do so. All but the stupid can comprehend, and all but the indolent will apply the rules which sound generalization supplies. All who read, know very well the common constituents of plants; all, however, are not expert enough to conduct the analysis necessary to find their proportions in composition, or the absence of either in the soil. They know the principles of growth and the causes of sterility—the diseases and the remedies.

Topics such as these have become so common and interesting, as in many neighborhoods to have supplanted those of vicious and mischievous excitement. Upon these very grounds we hear constantly close discussions and keen criticisms upon modes of culture, and witness a constant interchange of its ways and means, and they are not among the small gains which come of our annual gatherings.

DIGNITY OF LABOR.

From an Address before the Norfolk Agricultural Society.

BY HENRY F. DURANT.

How intelligible are the lessons of prudence, of foresight, of thoughtfulness, which the farmer's life teaches him. No day but brings its duty, no season but brings its necessary labor. The farmer does not talk of luck or chance, or believe that a fortunate rise in stocks will fill his barns. The seed must be sown—but that is not all; nature never gambles; she has taught him that she never deals in chances; the seeds must be good—the ground must be ploughed. He may manure his land well or ill, but he knows there is no chance about it—unless he manures his fields, they tell him we have no good luck for you; real estate may rise without manure, but corn will not. The corn must be cultivated, too, and weeded, and cared for—stocks and merchandise may increase in value without your labor—the root of all evil may grow without cultivation—(no other root but weeds only will)—and whether that is not a very noxious and dangerous weed, is a question about which there are many opinions. This is but one illustration; consider in how many forms these lessons are repeated to you in your daily life; consider of how many prudent virtues they are the necessary foundation.

Do they not teach you also that the same laws regulate your social position—your moral being? If you neglect your duties to your neighbors, do you hope to have their esteem? If your life is a daily routine of dishonesty, do you expect to be in good repute? If your life is immoral and dissipated, does it not wear away yourself, your name, your mind, and your moral nature?

Daily, almost hourly, even in the city, although repeated in more doubtful and difficult language, do I see new proofs

of that other, but similar great law—an opportunity never comes back again. But in the country this is always before you. Does the seed-time come back again ever? Can you ever put off until to-morrow the duty of to-day? Were I to sum this all up in one word, there is but one which I know comprehensive enough to embrace it all, and that is indeed a word full of meaning—labor! "Thou shalt labor" is the commandment which life daily repeats to us. Every man has his task set before him, and the duty of patient, thoughtful labor is his blessing; or, neglected, it becomes his bane. Let us reason together upon this subject, and we shall find that there is in all this the deepest cause for gratitude. It is an answer, also, to those complaints of which I spoke—those grumbling complaints, so unworthy of a true man. How often do you hear it said, how often, too, do you repeat it. "Oh! my farm is poor, this New England soil is barren, the West is the only place for farmers!" or "I am too poor to farm to advantage," or, "my education was neglected. I cannot go ahead and better my condition, like my neighbor so and so,"—or, worst of all, "I have no luck, every thing has turned against me." All this is false, unspeakably false. These are not the lessons of living,—grumble them hourly if you will—sit sulking like a child in the corner, and let the world go by you if you will,—but these are not true; on the contrary, there is no New England farmer who reflects, who really does his own thinking, but thanks God daily that his heritage is given to him here in this cold clime; on this soil which yields to labor only—rewards labor only. A true man does not grumble because he was not born with a golden spoon in his mouth: he knows that gold is a soft metal, and does not wear well—iron is better. There is no one here to-day—who is any thing, who has made himself any thing, who feels that he is a living, real man—who does not in his heart of hearts thank Heaven that he was not born rich. How false and shallow is this complaint of one's lot in life, this complaint of our toils and labors. The exact truth is, that the primal curse, as we call it, "in the sweat of thy face shalt thou eat bread," is a blessing in disguise—perhaps the highest blessing. This is the real and earnest belief of our age; the age of iron is passed, and the age of gold is passing away; the age of labor

is coming; already we speak of the dignity of labor, and that phrase is any thing but an idle and unmeaning one; it is a true gospel to the man who takes in its full meaning; the nation that understands it is free, and independent, and great. The dignity of labor is but another name for liberty. The chivalry of labor is now the battle cry of the old world, and the new. We hear it from England, great, brave old England; sometimes, too, though more faintly and doubtfully, from sorrowful, struggling Italy. Cherish these brave, brave thoughts, then, in your hearts; let those noble words, the dignity of labor, be your battle cry, as you fight the battle of life. The age proclaims these truths at last; but nature, the green fields, the waving harvests, proclaimed them long ago. Ask your corn fields to what mysterious power they do homage and pay tribute, and they will answer, to labor. In a thousand forms nature repeats the truth, that the laborer alone is what we call respectable—is alone worthy of praise, and honors, and rewards. In other years, men paid almost divine honors to the successful heroes in their bloody wars; the soldiers returned home in stately procession, and triumphal arches were built in their honor, with silken banners fluttering from their sides, and bright garlands adorning their sculptured stones. These splendid structures were the tribute which man in those by-gone days paid to the victorious soldier; but nature does honor to her peaceful soldier still, and as every humble laborer seeks his home at nightfall, a more majestic arch of triumph soars above him, and he marches bravely forward, conscious of a day of duty, and of successful toil, under that eternal arch, which was builded when the foundations of the great deep were laid. The sunset flings silken banners of crimson and gold along its stately sides, and the constellations from its deep blue vaults hang garlands there in clusters of those holy stars which are the perennial flowers of heaven.

Our fathers had this lesson of life, this lesson of self-respect, this lesson of the value, the nobility, the dignity of labor, taught to them in earnest long ago. The wide ocean divided them from royal power, and from the bonds of wealth and rank and custom; the woods and the forest taught them to work if they would live; taught them, too, that the man who changed the wild wood and the dreary marsh to a happy

home, had done something—was a man—was better and more to be respected than the rich man who might purchase or inherit it; taught them that the tangled rushes and the rank weeds and the grey moss would grow over the man who did not work: taught them that the man who could rule his farm, could rule himself; and finally, when they came to open their eyes and look into the matter, taught them all at once that they were the real kings, and had been kings all the while, not somebody's son over the sea. This was the democracy which nature then taught to them, and repeats to us to-day. I love to remember what naturalists have told us, that the symbol of industry, the "busy bee," was unknown to America before our fathers came here. The Indians called it the "fly of the English," and learned to dread its approach. Even now, in the western prairies, the bee is the scout and the pioneer of civilization. Let us complain no more, then, of labor and toil; let us talk no more of disadvantages, and opportunities, and poverty, and self-made men.

The man who does not labor has no right here; he is in the way—the busy world crowds him out of the path; opportunities and advantages are all around us, but they are for the men who wake up and open their eyes in the morning—not for fops and sluggards. To be born poor is a blessing, not a curse; the only real poverty is inside the man, not outside, and all men who are made at all, are self-made men; schools are good tools, and colleges, and books, but they must have men, not children, to use them. There is one great, true book written by the finger of God, and its pages are opened all around us, of which those other books are after all only poor and partial translations; the true book is written, as of old, on tables of stone—written, not in ink, but in letters of light, and the wide sky, and the wonderful ocean, and the mysterious forests, and the green, cool meadows, and the dreaming flowers, and bird, and tree, and man, are its living pictures and illuminations. This, then, is your birthright, and your inheritance; not a life of wealth, and ease, and repose, but a life of brave toil and trust. Accept this heritage with joy and gladness; work while it is yet day. Let your life be like the tree, which pauses not in its climbing, until it has reached its ordained height. The tree which, although rooted in the

dark, cold ground, struggles towards the light, and stretches out its great limbs, tossing and striving upwards towards the sky. Take this thought with you, but take it in better words than mine—in the words of our noble American poet, Longfellow, whose great, true thoughts have found fit utterance in a psalm—a real psalm of life—a fit poem for America.

Life is real, life is earnest,
And the grave is not its goal;
Dust thou art, to dust returnest,
Was not spoken of the soul.

Let us then be up and doing,
With a heart for any fate;
Still achieving, still pursuing,
Learn to labor and to wait.

But this rural life does not deal in utility alone, or in the practical teachings of life and duty only—it has its lessons for the heart, its influences upon the affections, its sweet, kindly story of home. It seems a paradox to say that you separate men by uniting them, and yet it is true. In the country you live on your farm, and you have neighbors, though they live half a mile away. In the city you live in a block, and you know not even the name of the family at your next door. In the country, nature, by constant laws, teaches that you are not sufficient for yourself alone. You are dependent on your neighbors in a thousand ways; you need friendship and sympathy. You must borrow and lend, you must help and be helped. In sickness and health, in sorrow and joy, in wealth and in poverty, there must be a perpetual interchange of good offices.

When we turn over the leaves of this wondrous book, there is one page in which are inscribed the loftiest thoughts, the noblest lessons, the most beauteous pictures of life. There is one word which sounds and swells with universal music to every heart—a music of fears and hopes, of memories, of joys and sorrows, the one, old, dear word of "Home!" How many thoughts cling and cluster around it. How many memories rush unbidden with the word—of the past as well as of the present—of those early days which we would fain recall,

of that old house in the country which we loved so well, those green shadows which have passed away—those vanished shadows, and the children playing in the shadows, which we can see far off, as if in some beautiful dream. The light that is not on land or sea lingers always around those hours, and hallows them forever. Who is there among you who does not recall the picture of a happy New England home, seen from the highway as we journey along at eventide? Seen in the sweet, sacred memories of other years, you seem to feel the hush of peace and repose which dwells beneath the drooping elm trees that shade and guard the door. The last rays of the sunset are fading in dissolving beauty in the west, and in their soft light you can see the farmer who, by his thoughtful labor, has earned his repose. He is resting there in the wide porch, looking out over his well-tilled fields, watching the last fading traces of the sunset—the first trembling beam of the evening star, as he will watch one day for another sunset and for another evening star, and will know then it is his morning star also. Beside him is the wife and mother—for what would be the picture of a home if woman's sweet influence and empire were forgotten? We should miss the flame on the altar, the fire on the hearth, the angel in the house, if her form were wanting there. Flowers are growing in the shelter of the porch, but fairer flowers are blooming in the shelter of that quiet home. Her daughters are with her, not languid and pale, but as fresh and modest as the dewy rosebuds, half opening by the porch. On the grass, a little apart, the boys are gathered,—a little apart, for with a growing sense of manliness they are beginning to separate themselves, and lay their own plans for their future, studying out what independence means; and over all bends God's beautiful sky; over them all flows softly that deep, blue, boundless river, which we call eternity. As a contrast with all this, think of the homes of the poor in the city. The country spreads a tender, kindly grace over even the home of poverty; the green trees wave gently over the ruinous cottage; the green moss conceals and adorns its decay; the wild rose and the soft-eyed violet grow on the grassy bank. But in the city, the poor live in narrow, squalid rooms, where the sunshine can never bring in its blessing. We build stately churches, and endow costly hospitals, but

the homes of the poor are always the city's shame. I must not now dwell upon that subject—it is the great reform which the hour demands, the reform which we must make, or it will be made one day in rough, wild way—demanded by justice, by charity, by policy, by the love of our country; but I turn to a fairer picture. A southern friend said to me lately, I have been in every State of our Union, but there is nothing so beautiful after all as a New England village. There is an air of refinement and good taste about the houses and gardens, a certain neatness and propriety, which is seen in no other part of the country. I confess that this flattery is very pleasing, for it is significant of many things.

This wish to adorn our homes is a silent recognition of the truth, that there is something more than mere use and thrift in the minds of our people. The house is not a shelter only from the seasons; it is the temple and altar of the affections.

Near the ancient dwelling place of the Natick Indians there is an old farm-house, with two vast, majestic elms before it, of which a significant story is told. When the puritan preacher in those by-gone days settled on that green slope by the River Charles, he conciliated the natives by his sympathy and kindness, and soon taught them to love and respect him. He had lived there but a few months, when the Indians brought two young elm trees from the forest, and with much form and solemnity planted them before his door. He asked their meaning, and they told him that they were "trees of peace." These trees of peace were only tender saplings then, which a child could carry in his hand, but they have grown to be monumental trees, venerable in their majestic beauty. The puritan settler, stern but kindly,—the red men, with their dark, unfathomable eyes,—have vanished away, and rest beneath their shade no more; the old house is fast falling to decay; the trees, too, will fade and fall some day, but those old, simple words have a more enduring life. I never look upon those trees, but the words "trees of peace" return again with sweet, soothing music. Yes, those words have their own natural music, and will not leave off their singing. Trees of peace! Can you not see those vast gray, gigantic arms, stretching over the roof-tree to shelter and protect that quiet home—dropping down their rich, waving clusters of green leaves, and waving

them with soft music in the sweet sunshine?—dropping down their rich shadows on the soft turf? Can you not look back to those old days, and see the young children playing in the grass, and the wild flowers playing like children in the shadows? Those shadows seem deeper, and the green turf seems softer for those old simple words of promise, and I have come at last to feel that every man who plants an elm tree to shelter and adorn the home of his affection, the home of wife and child, plants a tree of peace there. The Indian still reads it from out the wild woodlands; the sweet sunshine and the quiet shadows promise him peace and rest beneath their shade.

There is still left to us all an inherited memory of that antique Hebrew feeling of the sweetness of repose under one's own vine and fig tree—of that deep and intense feeling of repose which the children of Israel, exiles and aliens in Egypt—the wanderers for forty years in the gray, weary desert, might well feel when, in the green hills and forests of Judea, they could find rest at last for their travel-worn feet, could leave their folded tents, and make themselves homes at last in that land—then so beautiful and fair. We inherit that old, deep feeling, for we, too, must in some way be exiles and wanderers before we find repose, and the drooping elm tree at the door, the dewy rose-bush at the window of home, the fragrant honeysuckle at the porch—all are "trees of peace!"

This rural life does not teach industry solely, nor cultivate the affections alone—it appeals to all our higher faculties, it refines and elevates, it teaches us that there is a beauty in flower and tree, in sunshine and shadow, and in the waving bough, in the golden green light of the woods and meadows, and in the great wild woodlands, which was not bestowed without purpose, nor in vain.

We read in that old cherished book, "Bunyan's Pilgrim's Progress," how Christian, as he journeyed, "lifted up his eyes and behold there was a very stately palace before him, the name of which was 'Beautiful,' and it stood by the highway-side." As we too journey on in life's pilgrimage, that stately palace rises before us in its hushed and solemn beauty; it stands now as of old by the highway-side, and its lofty portals are thrown open wide, that whoso will, may enter there.

We go to the city to study the picture gallery, when every window we look from gives us a picture, which, if we would but study it, mocks the painter's poor imitation, a picture which was never and can never be painted. Every tree, every green shrub, every graceful bough, as it waves in the sunshine, will give lessons in coloring and form which laugh at the artist's brush. We go to Italy to see the beauties, and wonders, and mysteries of another age, while around us lies the true Italy which we should study.

One of the most wonderful monuments of Rome is a stately obelisk, which has its own strange history. Far back in the dawn of time it sojourned in Egypt. In the sacred City of the Sun it lifted its red granite shaft, pointing beyond the earth—beyond the stars—the silent witness of the splendor and decay of mighty empires, now lost in oblivion. When imperial Rome sent her iron legions beyond the pyramids, they brought this wondrous column to Italy, as the proudest trophy of their conquests. No ordinary power was worthy to bear such a costly gift to Rome. The sacred Nile itself was turned from its channel, and sought it far away amid the silence of the sands—sought it in its home in the ancient City of the Sun, and bore the heavy burden to the Mediterranean; the sorrowful tribute paid to the Tiber by the conquered Nile. It was carried in festal triumph to the seven-hilled city, as the very seal of her imperial splendor, but it bore its own dark omens and evil destiny with it, over the blue Mediterranean, and became only the prophetic witness of Rome's decay. Now, as of old, it stands amid the ancient ruins, the chronicle of a vanished religion, a buried civilization. Its tapering sides are carved with hieroglyphics, which record the history of ancient dynasties, the wars, the conquests of Egypt's forgotten kings. At its feet is buried all that made Rome great in those old days of valor and conquest, of power, and pride, and splendor. Now, as of old, it stands in a sacred city, unchanged, while all around it is changed, the same mysterious and impressive monument of man's greatness and man's decay. No, not unchanged, for that dark obelisk of Egypt has forgotten its ancient worship of the sun,—has renounced its allegiance to the departed gods of Rome, and now it points serene and calm to heaven, lifting far up in the blue vaulted sky the sacred symbol of the cross.

We leave our homes and journey to Italy to study there the lessons of history—of art—the wisdom and the beauty of a vanished age: but we have before us always monuments more ancient, more impressive, and more beautiful than Rome can show. The humble grass which we trample daily under our feet can reveal a history more ancient, and more strange, and secrets more marvellous. That slender elastic stem, which waves so gracefully in every breeze, which bends but breaks not even in the storm, is a tower builded atom by atom, not of red granite, like the obelisk, but of the purest emerald flint. Arch above arch—story above story—it lifts its cells and chambers from the dark earth, storing them as it rises, with its ripened sweetness. Winding channels, too, are formed, through which throb and flow hidden currents, as mysterious as our own vital blood; but their secrets are as yet undiscovered and unknown. The delicacy and the strength of that astonishing masonry laugh at the poor imitations of human skill. Is there an artisan so skilful who could build one of these wonderful cells, or frame one of these perfect arches,—a painter so skilful, who on his pallet could mix and mingle the hues of that delicate emerald? The history of that structure is more ancient than obelisk or pyramid, for it dates back to that wonderful, unimaginable dawn when God said: "Let the earth bring forth grass, and it was so." It has had its journeys, too, and migrations.

From those pastoral plains of Central Asia, which were the ancient home of our race, the grass has followed man all over the globe, at once the pioneer and the proof of civilization—not as monuments of barbaric wars and triumphs, built only to decay, but of civilization, of humanity, and of progress: and the wild woods vanish before it, and the dark morass is changed to verdure as it journeys on. Like that obelisk of which I spoke, it was a worshiper of the sun, but it has never forgotten its consecration, nor renounced its allegiance. It is the faithful witness of the Divine power which gave it birth, the unerring chronicle of His power and majesty. Its religion has never changed, and can never vanish, but year after year it bears aloft the consecrated symbols of flower and seed—the flower that withers and fades, as life must fade, the seed that is the fruit of departing life, the pledge and promise of a resurrection. It has its own hieroglyphics, too, inscribed upon it, not the

records of bearded kings, but the secrets of life, the secrets of creation, mystic signs and symbols, the keys of which are lost to earth, and are read only in heaven. Ages upon ages ago it received the command to bring forth seed after its kind, and it has never forgotten its trust; buried, like Egypt's wheat, with its mummy reaper, for three thousand years, it never forgets its duty. No human power can make it produce aught from its tiny seed, excepting "after its kind;" and to-day it rears its beautiful shaft crowned with waving, graceful flowers and tasselled seed vessels, as of old. Do we know any thing, after all, of this slighted, unnoticed grass? Have you really read *one* of its mysteries? It grows from the seed, you say—but how, and why? What is hidden in that small shell, which brings forth this strange organization? Explain if you can, one mystery of its existence, one secret of its growth and change, one of the hidden sources of its beauty, its strength, and its usefulness to man, and then go to Italy if you will, to wonder at the obelisk which the sorrowful Nile sent to imperial Rome, and study its mysterious secrets. This is but one example which I have selected, on account of its humility; but the world is overflowing with this wonder and mystery, which, for want of another name, we call beauty, and the beautiful. We see it in the fading sunset, the vanishing clouds, in the haunted shadows of the forest, in the delicate wild flowers, more beautiful and more rare, if we would but examine them, than our coarser garden flowers. It is heard in the sounds of the lonely wind, mourning among the pine boughs, in the music of the wandering brooks, in that morning concert of the birds, when in full orchestra they welcome in the dawn, in the voice of the solitary thrush, singing alone amid the woods, in the deep quiet of noontide. The ancients in their beautiful fables symbolized this beauty, and told of nymphs who dwelt in the shadows, and who haunted the trees, the mountains, and the waters. That beautiful fable has vanished, but the more beautiful reality remains; we hear every where voices from the spirit land, we recognize every where the footsteps of angels; all around lie those manifestations of Divine power which refine, and elevate, and purify.

One of England's true poets, Gerald Massey, who indeed learned in suffering, what he taught in song—himself a poor

factory boy—educated by poverty, great by the aid of his struggles, sings thus in one of his songs for the people:—

"Come from the den of darkness, and the city's soil of sin,
Put on your radiant manhood, and the Angel's blessing win,
Where weal their sunlight comes from Heaven, like welcome smiles of God,
And earth's blind yearnings leap to life, in flowers from out the sod.
Come worship beauty in the forest temple dim and hush,
Where stands magnificence dreaming, and God burneth in the bush.
Or where the old hills worship with their silence for a psalm,
Or ocean's weary heart doth keep the Sabbath of its calm.
Come let us worship beauty with the knightly faith of old,
O, chivalry of labor, toiling for the age of Gold."

I am well aware that such thoughts as these are not the daily companions of our farmers, the hourly emotions of all who dwell in the country. The farmer who hoes his corn does not spare the wild weed which grows there on account of its beauty, nor when he is hurrying to save his hay does he watch the sublime beauty of the thunder cloud, but whoever looks down from his lofty pinnacle of self-complacency, upon our plain country people, and believes they do not study,—do not reflect,—do not appreciate what is beautiful and sublime,—do not appreciate the great truth that all this beauty was not created without an object,—do not refine and cultivate their hearts and brain by the study of it, knows nothing of the hearts of our people, knows nothing of life and its lessons. There are churls, to be sure, who care nothing but for their fields and their crops, who think only of manure, and pigs, and potatoes, but they are not representatives (thank Heaven) of our New England farmer.

There is a wild German story of the adventures of the student Anselmus, in which it is related how an old magician shut him up in a glass bottle, and placed it upon a shelf in his study. Poor Anselmus was unhappy enough in his narrow quarters; but he was not alone; he found on the shelf beside him other students;—Cross Church scholars and law clerks, shut up in bottles too, like him, but unlike him they were unconscious of their confinement, and thought themselves all the while enjoying life, drinking double beer and singing like true students, "Guadiamus igitur." There is much significance in that story; many men are shut up in bottles, and all the while are uncon-

scious of it. You can laugh to yourselves, no doubt, and think of many of your neighbors besides the drunkards who live shut up in their own glass bottles, living regardless of all the duties of life, selfish churls, without friendships or affections, who can never grow better, or wiser, or more kindly, but only a little more selfish and cold as they grow older. Let them remain there; the country will have no useful influences for them. They would barter their birthright in the stars, and exchange all that sweet, holy beauty for a single tallow candle to light their gloomy dens. They would rob the sunset clouds of their gold, if it would but make a little dollar for their pockets. Every rose bush would bear thorns only, and not flowers, could they but make the laws of creation. Such churls are not good men, nor good farmers either. Nature hates a churl and a miser; his fields are traitors to him—his crops rebel against him—his fruits fail him; it is but another illustration of the doctrine, "No work, no wages!" A farmer who thinks only of himself—of crops and of money, and forgets the duties of man, of life, and home, is false to himself, because he is true to himself alone, and by the sure, slow, certain, and inevitable laws of life, his fields and his farm will betray him, and be false to him also. But I repeat it, these are not the representatives of our farmers, nor the results of rural life.

I have often noticed this general difference, that in the country men reflect more, are more conservative and thoughtful. In the city men live by the railroad, and the telegraph; the morning newspaper thinks for them; the excitement of to-day is forgotten in to-morrow's news; they do business by steam and electricity, and decide on the spur of the moment; they are all *fast* men.

But in the country there is more reflection and thought. The deep, pastoral solitudes have their uses, and their profound instructions. There is always food for thought here. In the city, if we pause and step aside from the current, and shut our ears to the rush and roar of life, we see only the works of man —not the beautiful, the elevating and refining works of God. Even at night, when we creep home through the streets, tired and worn, if we look up at the holy stars, there come to us weary hopes and despondencies, which are not to be spoken or

cherished—longings, and sorrows, and memories, which are all to be put aside and forgotten.

But in the country you are surrounded with wonder, and mystery, and beauty; you cannot escape them—they follow you into the dark shadows of the wood—they are beneath your feet, although you trample upon them, they cluster around you as you stop to rest. A very learned friend was speaking to me lately of the modern skepticism as to miracles, and the ingenious doubts and speculations of science, which disturb the ancient faith of so many minds. I plucked the white clover blossom at my feet, and replied, "I need no higher miracle than that." Yes, that is the only miracle we need; tell us how, century after century, this humble flower has perpetuated its mysterious birth and growth;—tell us why the seed has kept its plighted faith to the Spring, and year after year has blossomed always the same;—tell us who taught it to seek out in the dark ground, or in the invisible air, that subtle food which it turns into its own substance;—tell us how this plant, which we call lifeless and inanimate, can produce from its own being that mysterious seed which man's wonderful brain not only cannot imitate, but cannot even understand in its laws, its structure, or its creation, and we will then talk of other miracles, and discuss probabilities. Until then we need no higher miracles. How true is it that this world is full of miracles, full of teachers, who are all inspired; and when the sweet season of Pentecost comes, in its green beauty, they speak as of old, with tongues of fire.

Listen then to these voices; learn these psalms of life; let them instruct you in the dignity of labor and the duties of living: let them teach you by the serene, silent influences of beauty: let them steal gently into your hearts, and shape your lives by their sweetness and by their sympathy; for those voices of life and nature are not given without purpose nor in vain. They are the angel songs, which are sung on earth and in the sky; they are the sacred oracles of heaven.

Will you go higher than the farm—its uses, its thrift, its laws of labor—or than the home, with its affections, its duties? The way is easy, and the path is open; the landscape widens as we climb the hill, the air is purer, and the vision more clear. This great book which we call rural life, country, nature, is a

beautiful story, which has no ending—its pages unfold ever new mysteries; the loftiest genius finds information and instruction and inspiration there; the highest intellect comes there to learn. It gives you the thoughts which lie too deep for tears, the sunshine, and the glory which is brighter than the sun.

In this marvellous book of life there is inscribed on every page, Excelsior! Eternal progress and aspiration is the last and loftiest law of nature; taught by the tender flowers which leave the dark, cold ground and seek the sweet sunshine, unfolding their delicate beauty towards the heavens; taught by the trees which lift their green columns aloft, and from the topmost limb that looks up at the sky, point always higher; taught by the never resting winds, which wander past the lonely mountain peaks; taught by the mountains, which lift away their gray cliffs above the clouds, and stay their starry soaring only when they have linked the earth and the sky together—until, as you gaze on their aerial summits, heaven seems nearer, and eternity more sure.

Astronomers tell us that it is written in the wondrous ordinances of heaven, that the stars shall change their places in the long lapses of time. The constellations which are now visible in our northern latitudes will disappear below the horizon, and other stars will fill their places. Belted Orion, and the white light of Sirius, and the sweet influences of Pleiades will pass away, and the Southern Cross, now seen only from the land of Palms, will arise in its mysterious beauty to shed its tender, trembling radiance upon our midnight sky. Yes, even in the stars, which we call fixed, there is endless change and progress. Let us learn from them that highest lesson, and let us seek to make our lives like the star that hasteth never—resteth never—but still moves onward in its appointed way. We need not to wait for another dawn, for another life—we need not wait until we pass the mountain and the river—we are on the mountain now; look up, the river is flowing noiselessly over our heads, and—

> "From the sky serene and far,
> A voice falls like the falling star,
> Excelsior."

FARMS.

WORCESTER NORTH.

From the Report of the Committee.

We earnestly invite the attention of every farmer to the following account, kept in a regular business-like way. If every one would adopt and carry out this plan, how many would abandon some modes of cultivation, or some crops, which have been *supposed* to be profitable, but which the account might prove to have been far otherwise. Impressions are often erroneous, facts and figures are wanted to confirm or confute them. Open an account with every field and crop, noting down, in a book to be kept, every item of expenditure, whether of labor, manure, seed, or any thing else, depth of ploughing, time of planting, &c., and credit the crop, and see on which side lies the balance. A regular system of putting down, *every evening*, an account of the work of the day, takes but little time, and soon becomes a habit, and then is attended to as a matter of course; and at the end of a year, or a series of years, you have a mass of facts by which you may profit, and of which you may be proud. Let no sleep visit your eyes any evening until the account is fair in the book.

We would congratulate our brother farmers upon the improvements which have been made, and which are constantly being made in agricultural affairs, particularly in the implements at our command, and in saving and using manures. No man now can pretend to good management without a barn cellar for the saving of solids and liquids, without exposure to wind and rain, which would dissipate by evaporation and leaching the best part of the fertilizing properties of the manure. The importance of using to the best advantage every waste article which can be decomposed in the compost heap, is becoming more and more apparent. If more Yankee shrewdness were brought to bear upon this point, there would be less disappointment in regard to crops. Then in using manures, are they not

often covered too deep? Take a quantity of the liquid which has leached from your dung heap, thick and strong, and let it leach through eight or ten inches of sand or soil, and you get water clear as that from the brook; all the fertilizing parts having been retained in the eight or ten inches of soil in the leach tub. Being satisfied that this is true, would it not be wise to leave the manure near the surface, to be dissolved and carried down by the rains? Plough deep, save all your manure, and leave it near the surface of the field.

T. R. Boutelle, *Chairman.*

Statement of Lemuel Pitts.

The farm I offer for your consideration I bought in the spring of 1854, and commenced operations about the 20th of April. My former business having been in Boston during the past twenty-five years, I consequently came entirely ignorant of farming operations; I thought, as most city people do, "that any fool could make a farmer." But I found myself much mistaken before the first season was over. My greatest object in purchasing a farm was for the benefit of my family, particularly my boys, and my expectations have been realized; they have done much better than I expected for boys brought up in the city.

The farm contains sixty-nine acres of naturally good land, but had been owned by a physician some eight years or more, who did not prescribe much nourishment; consequently it was somewhat reduced under his treatment. The year previous to my purchase, it only produced sixteen tons of hay. It is divided into pasture, mowing and tillage, say thirty-five acres pasture, twenty-two mowing, and twelve in tillage. The grass lands have not been improved so much as I should like, owing to my attention being turned to the cultivation of an orchard. I think that is of the first importance in farming: get a good orchard started, and take care of it, and it will be sure to pay.

After the first year we have set out about two acres each year to apple and peach trees, and now have six acres covered, and we think they look well. I intend to increase my orchard

two acres a year for several years to come: by so doing, the outlay will not be felt so much as though it was done all at once. The soil on a portion of my farm is cold and heavy, with a clay subsoil, which retains the water until late in the spring; consequently I find a great increase in its productiveness by under-draining, which is done yearly as we have opportunity. We drain from twenty to thirty rods per year, and intend to continue as fast as we can without going into extra expense.

Our mode of cultivation in the field crops is as follows:—We turn over our grass ground, say three or four acres, in the spring, and plant on top the sod with potatoes, using guano and plaster in the drill, from three to four hundred pounds per acre, and generally have had good success; the quality of the potatoes is much better than that of those planted on stable manure. The second year we spread on from twenty-five to thirty loads of manure, and plant with corn, using a compost manure in the hill. The third year seed down with spring grain; by so doing I go through with all my tillage land, except the orchard, in about six years. The young orchard I keep ploughed, and get crops enough off to pay the expense. The year previous to setting out my trees I manure high, but after that I use very little. Our stock consists of six cows, grade Ayrshire and Devon, one yoke of oxen, two horses, eight or ten head of young cattle, and five hogs. The last named gentlemen I keep more for their services under the barn, than I do for the profit of the pork. I keep them well supplied with loam, and any thing which we can get for an assortment. The cows and oxen are stalled nights during the summer, and make almost as much manure as in winter. Our fruit crop being very small this year, is unfortunate for me; I am fearful when I foot up this year's doings, the balance will come on the wrong side.

My peaches and grapes have averaged about four hundred dollars per year; this year they failed entirely. The labor has been done by myself and two sons, one eighteen, the other sixteen years old, and one man seven months, with a small amount of extra labor during the haying season. Below you have my statement of the products and expenses, as near as I can estimate them:—

Elm Dale Farm, in Account with L. Pitts.

1859.	Dr.
Interest on land,	$240 00
One man, seven months, at $16,	112 00
Boarding man seven months, at $10,	70 00
Stable Manure,	25 00
Guano,	47 50
Super-phosphate of Lime,	30 00
Plaster,	4 50
Taxes,	32 40
Use of tools and blacksmithing,	50 00
Seeds, all kinds,	50 00
Extra labor at haying,	42 75
	$704 15

Contra.

Hay crop, 35 tons, at $15,	$525 00
Corn Fodder,	20 00
Wheat Straw,	10 00
25 bushels Wheat, at $1.50,	37 50
138 " Corn, at $1.10,	151 80
5 " Beans,	10 00
21 " Early Seed Peas, at $8,	168 00
7 " Marrow Seed Peas, at $6,	42 00
120 " Carrots, at 25 cents,	30 00
75 barrels Carrots, at $2,	150 00
307 bushels Potatoes, at 50 cents,	153 50
20 " " small, at 25 cents,	5 00
35 barrels Apples, at $2.50,	87 50
Pumpkins and Squashes,	15 00
Beets and Parsnips,	10 00
Product of Dairy, Milk and Butter, Calves, growth on Hogs, &c.,	240 00
Pasturing Cows,	21 00
1 Colt, Foal,	25 00
40 pounds Cucumber Seed, at 75 cents,	30 00
20 " Carrot Seed,	15 00
Turnip Seed,	3 00
Asparagus Roots,	15 00
Turnips,	10 00

Cider, ...	$9 00	
Produce sold, ...	97 44	
Labor done off the farm, self and team, .	205 50	
Improvements, Draining and Ditching, &c., growth on young Trees, . . .	233 00	$2,319 24
Balance in favor of Farm, ...		$1,614 99

NORFOLK.

From the Report of the Committee on Farms.

The subject of farm improvement, particularly by drainage, has been brought to our minds with great force. We have noticed, in some instances, large tracts of land in a comparatively worthless state for want of thorough drainage, which are evidently susceptible of great improvement, and might be rendered valuable and productive, without any large outlay of expense or labor. We have observed other tracts, incumbered and disfigured with needless walls, or with heaps of useless stones gathered from tillage grounds, which would help at once to enrich and beautify the farm, if these walls and heaps of stones were buried out of sight, or if, better still, they were used in constructing drains that are plainly needed there. And, on the other hand, we have been gratified with a view of once waste, swamp or bog lands converted into smooth, fertile, and highly remunerative tillage or mowing fields. We have seen a farm, once crowded with division walls,—literally cumbering the ground, and constructed only for the purpose of disposing of superabundant rocks and stones,—now presenting a wide, unbroken surface of tillage and mowing land. The land being springy, and much of it sloping from surrounding hills, large portions have been thoroughly drained, by opening ditches of great depth and width, into which an almost incredible quantity of rocks and stones have been judiciously laid, and then the excavated soil replaced. And, although the labor required has been hard and at times disheartening, yet the result will, beyond question, be remunerative, in the returns of a much larger superficial capacity, and higher temperature of the soil. The improvement will, also, be a permanent memorial

of the intelligence, industry and perseverance of the farmer, upon which his posterity can look with grateful pride and satisfaction.

In a discussion of the subject of drainage, at a late meeting of the society, in Dedham, it was remarked, by a gentleman who is perfectly conversant with the matter, that "drainage is regarded as the greatest agricultural improvement of the nineteenth century." It is a subject which yet remains to be considered and understood by the mass of farmers in this county. And we cannot do them a better service than by recommending to their careful examination the treatise on drainage, recently published by Hon. Henry F. French. This work is the fruit of much observation and reflection by an eminently judicious, practical farmer, as well as sound scholar, and is believed to be the most thorough work upon the subject adapted to the wants of the farmers of New England.

We have often had occasion to remark upon the tenacity with which many farmers still keep their swamps and swales in a natural condition; under a false idea that, in this condition, they produce more grass than would be possible if they were drained. The fact is, as experience has often proved, that, if the work were properly done, they would yield at least an equal if not greater quantity of grass, while the quality of it would be superior. Indeed the beneficial effects of drainage, upon all such lands, can hardly be overestimated. If judiciously applied, it changes and ameliorates the whole character of the soil. It may also be safely and with benefit resorted to, whenever a moderate degree of moisture remains apparent in the earth through the season. Nor needs the common fear of the effect of drought to be regarded. For, contrary to the general apprehension, and paradoxical as it is, experience has proved that the most thoroughly drained lands are least effected by excessive droughts. Even the proper use of the subsoil plough is known to be followed with a similar result. And so highly is the temperature of moist lands raised by thorough drainage, that a farmer in the eastern part of Maine, who has thoroughly drained his farm, now says of it, that his farm has been removed to Maryland; and that, whereas, he could once only grow potatoes and poor grass, he can now raise and enjoy,

in perfection, all the grains, vegetables and fruits of a more genial climate.

The farmers of Norfolk county have not the obstacles to contend with, which once baffled the endeavors and lessened the comforts of the farmer alluded to in Maine. But how many acres, of nearly every large farm in the county, are now comparatively worthless in their natural state, which possess all the elements of fertility, and might be rendered abundantly productive by a judicious system of drainage? How much coarse, sour herbage, or pale, stinted vegetation may be seen, caused by excessive, though concealed moisture? It may be supposed that while the moisture is below the surface, or but seldom apparent above it, there can be no necessity for draining. Yet the quantity of water actually discharged by a single drain from lands in such a state, will often exceed all previous belief. And the subsequent fertility of the soil and earlier maturity of the crop upon it will clearly demonstrate the importance and benefit of an operation, the effects of which no quantity or quality of manure alone could have produced.

Undoubtedly there are many large tracts of low, moist ground, that cannot be thoroughly drained; especially on the borders of the Charles River. But such tracts may be greatly benefited by digging ditches in them at proper intervals, and throwing the excavated soil upon the surface, so as to shape it into beds, rounded up, and having considerable elevation in the centre of each. Grass seed sown on these beds, with a good top-dressing of manure, would grow luxuriantly and yield heavy crops.

But it may be said that the expense and labor attending the drainage of moist, and the reclamation of waste lands, is an insuperable objection to the practice, with most common farmers. We admit that such an objection may properly cause many to hesitate about such undertakings. But we are disposed, after all, to think the objection in most cases are imaginary rather than a real and sufficient one. We have in mind a reclaimed bog, in the town of Franklin, of which, we presume, a detailed statement will be given, in its proper place in this volume, and which strikingly proves the folly of supineness and a timid apprehension of failure, as a hinderance to such an enterprise.

This meadow, or rather this once useless and unsightly bog,

contains about thirty acres. An energetic and enterprising farmer bought it, a few years since, for $190. He then purchased a right of way to it for $20; making the whole original cost $210. He had paid for bogging and gravelling, $47 per acre; and upon one portion of it, we saw the finest vegetables growing; while, from another portion, the owner had taken a crop of herds-grass, weighing on the public scales, at the rate of over three tons per acre. The whole designed operation had not, at this time, been completed. But the land already reclaimed and cultivated was estimated by good judges, then present, to be worth $300 per acre. We know no reason why the whole tract may not be brought into an equally productive and remunerative state; nor do we know any sufficient reason for the supposition that hundreds of similar tracts in the county could not be reclaimed in the same way, and with similar advantage. True, the expense and labor must vary materially with the various localities of the land, and the different circumstances of persons undertaking the enterprise. We fully appreciate the spirit which seeks for the cheapest and best way of accomplishing any desirable result. We would have the attention of the society directed more to the cost than to any apparent results of an experiment.

We would have every premium which shall be awarded for any agricultural experiments or improvements,—for the finest animals,—for every article exhibited at our fairs, determined with special reference to its cost, and to the diminution of cost in obtaining its like, rather than to the fine appearance of the product itself. There are undoubtedly cases where the benefit of an improvement is outweighed by its cost. There are cases where an animal which obtains the premium at our fairs may, on account of the expense of its present condition, be less deserving than another, whose nearly equal condition has been more cheaply produced. The great question with every thoughtful farmer, in attempting any experiment to improve his land, or enlarge his crops, or feed his stock, is, and ought to be, "Will it pay?" The difficulty is, there is seldom reflection enough, or it is not exercised in a right direction; and many golden opportunities for bettering his condition, are thus lost to many a farmer. And believing, as we do, that no improvement in agriculture has yet been introduced into our county, which is destined to be

of so much permanent value, or to add so much to the productiveness of our farms, as thorough drainage, we would earnestly commend it to the consideration of every farmer.

The disappointments and losses occasioned by the peculiar character of the past season, give additional force to our own impressions of the importance and utility of drainage upon most tillage and grass lands. Had the coldness of the atmosphere been but partially compensated by the earlier cultivation and heightened temperature of the soil, which thorough drainage would have occasioned,—especially, if vegetation had been stimulated by a moderate use of guano,—we believe that more than half the grain now lost in this county, would have been saved.

The question may be asked, How does this thorough drainage ameliorate and warm the soil? We answer, by removing all superfluous moisture; preventing the escape of heat by slow evaporation of moisture, and rendering the soil porous and more susceptible to the influences of the sun and air. The rains and dews, with stores of ammonia and carbon, penetrate more readily a soil freed from stagnant and noxious waters, and leave their fertilizing properties in the earth, which immediately absorbs them, to nourish the growing plant. The beneficial effect of thorough drainage is said to have been illustrated by an agriculturist in France, in a simple manner, which brings it at once to the comprehension of every mind. "Take," said he, "this flower-pot. What is the meaning of this small hole, at the bottom? To renew the water. And why to renew the water? Because it gives life or gives death;—life, when it is made to pass through the bed of the earth; for it leaves with the earth its productive principles and renders soluble the nutritious properties destined to nourish the plants; death, on the other hand, when it remains in the pot, for it soon becomes putrid and rots the roots, and also prevents new water from penetrating."

In connection with thorough drainage for the earlier cultivation and maturity of the crops, we had intended to present for consideration the deep ploughing which should follow it; and the nature and application of the manures best suited to aid in producing its beneficial results. But the limits to which we are obliged to confine ourselves, forbid our entering upon these topics. We cannot, however, forbear to suggest the importance

of a thorough disintegration of the soil in the mechanical preparation of it for the seed; the importance, also, of an early planting of those crops which require a long season for their maturity; and the use of ashes, guano, or a rich compost, as a stimulant in the corn hill and on the grain field.

Irrigation is a method of fertilizing grass lands of which the intelligent cultivator, in favorable situations, may avail himself with great advantage and at comparatively little cost. It is not common in this section; but wherever introduced and judiciously managed, it has been attended with satisfactory results. A distinguished American agriculturist, who had observed much of it in Europe, remarks, that, in his opinion, "there is not a cultivated portion of the Union, the productiveness of which might not be increased one-fifth by irrigation." A farmer in the State of New York, who had practised it for four years upon a farm favorably situated with a stream running through it, says: "The lands irrigated were formerly the most difficult I had to keep in grass or meadow, being mostly of a gravelly loam soil, and requiring constant applications of manure, and ploughing every three or four years, to keep it in tolerable condition. I now take a heavy crop of the best quality of fine, early made hay, without any return of manure but the simple water of the stream.

"I close these grounds from my stock the first of April. They are then fit to mow early in June, and will be ready, a few days after mowing, for pasturage; and will carry more stock at grazing than any other lands on the farm. In the most gravelly portions, the increase of the value for grass is more than five hundred fold; and the whole of it, I consider, has more than doubled, if not trebled, in intrinsic value.

"The water of the brook passing through the farm is dammed, so as to secure a sufficient head to carry the water in ditches on each side of the stream below the dam, and is spread from the main conduits over the land, where it remains as long as necessary, and is then shut off. I flow the grounds at intervals, at all seasons of the year; but when the grass is becoming fit for mowing, the intervals are longer. * * * The animalculæ in the brook water are also a great source of fertility."

It will be readily seen that irrigation can be practiced only in certain localities, and that the methods of conducting it

must vary with the nature of these localities. The cost, however, need not be great in any locality, and the experiment is worth trying, wherever it can be properly made.

We have seen only two places in the county where irrigation has been practiced to any considerable extent. One is in Franklin, where the method adopted seemed to be most effectual and its result profitable. But of this we have no account to present. The other is the farm of Mr. ——— Gay, in Stoughton. Of the method adopted and its results, in this instance, we have the following exact account from one of the most intelligent and useful members of the committee, by whom our attention was directed to it.

"Stoughton, Nov. 16, 1859.

"Rev. C. C. Sewall, Dear Sir,—The quantity of land which Mr. Gay irrigates, is about eighteen acres. The main source of the water used, is from springs rising from the foot of the hills a short distance back of his land;—though in times of heavy rain, much water comes from the rising ground upon each side of the lot, the ground rising for a considerable distance back. The lot contains quite a variety of soils. Some of the higher part is loamy; some gravelly, and some inclining to sand. A large proportion of the whole, however, is composed of mud and vegetable matter, varying from three to twenty inches in depth. The subsoil is a hard, clay bottom, and all the lower part of the lot too rocky to be ploughed to any advantage. The land descends from the upper to the lower end of the lot, and also from each side to the centre, sufficiently for the water to run off readily; thus forming a very favorable situation for irrigation. Ditches have been cut on the outer edges of the lot, so as nearly to surround it. From these, cross ditches have been cut, so as to carry the water over the whole ground. Besides the ditches, stone under-drains also have been made, to take off the water from portions of the field where it might otherwise remain too long.

"The ditches in the spring are kept full of water, but no care is taken to plough the land till about the first of May. Breaks are then made in the ditches, and the water is distributed over the land for three or four days and then removed. After an interval of a few days, it is turned upon the land again. This

process is continued till about two weeks before the grass is fit to be cut,—varying, of course, according to the weather,—when it is shut off entirely and the land allowed to dry. In a week or ten days after the grass has been cut the water is again turned on, in the same manner as before, and continued through the season. Sand is occasionally thrown into the ditches and allowed to wash over the ground. Late in the fall the land is manured with a compost of sand mixed with barn-yard manure. The sand having been carted into the yard early in the spring, a dozen head of cattle are kept upon it at night, through the season; and when wanted for use, it is worked over and carted upon the land. The whole land receives a dressing of this manure once in two or three years. Some of the driest parts of the field have been occasionally ploughed and planted. Then the land has been kept as dry as possible, and no water is turned upon it until it is laid down to grass again.

"This is the course now pursued by Mr. Gay; and the same has been practiced on his land for the last twenty-five years. His plans, however, have not yet been fully carried out, and his crops, undoubtedly, would be greatly benefited by under-draining still more of the land. The quantity of hay, as estimated by Mr. Gay,—and I think he under-estimates it,—is one ton to the acre, upon an average. The quality varies from the best English to common fresh hay of about two-thirds the same value.

"But this is not the whole benefit received from this irrigation. The soil having been allowed to dry thoroughly at the time of haying, when the water is again turned upon it, the grass springs up quickly and is very tender and sweet; furnishing till late in the season a great quantity of the best aftermath or fall feed. And this, coming at a time when pastures are apt to be dry, is an item of no small importance upon a dairy farm.

"Whether this plan of Mr. Gay's is the best that could be adopted, or whether his theory in relation to it is correct, (attributing the chief part of the benefit received to the matter washed upon the soil, rather than to the water itself,) may be a matter of doubt. But one thing is certain he gets a very

fair quantity of hay, and a great quantity of after-feed, at very much less cost than most other farmers."

Sheep-husbandry, which has been almost, if not entirely abandoned in this county, is now attracting the attention of many farmers in other sections, where it had also been abandoned. A stringent law has been enacted by the legislature, removing to a great extent what has hitherto been regarded an insuperable objection to the keeping of sheep,—the destruction of them by dogs. And large tracts of pasturage in the county are thought to be well adapted to the feeding of sheep. We have heard it argued by one perfectly familiar with sheep-husbandry and with the nature and condition of the farms in the county, that it would be practicable for every farmer here to keep as many sheep as cows, without any addition or change of pasturage; that the droppings of sheep form the richest and most valuable manure for pastures, and are best distributed over the land; and that, in proportion to their cost, no other farm stock yields so remunerative returns.

On the other hand, we have heard it said,—not, however, with reference to the nature and condition of our farms,—that setting aside the danger from destruction by dogs, which may now be partially or entirely provided against, the keeping of sheep in this section of the State has been found unprofitable, because attended with too many difficulties and risks, and requiring too much care, and therefore it is abandoned.

We cannot here enter into any discussion of this subject, nor have we the facts at hand which would go to prove either of these statements correct. We know from observation here and elsewhere, that it is perfectly practicable to raise and keep sheep in our county. We have seen one of the largest and finest flocks in this section of the State raised and kept where, if any where in the county, it would seem to be attended with peculiar difficulties. We have been told of its profitableness even there. And in other quarters, where the situation of the farms is more favorable, we know it is spoken of as altogether the most profitable branch of husbandry.

But if the business be not entered into upon a large scale, we are inclined to the belief that an equal number of sheep may be kept with cows, in most of our pastures.

And in this way an important addition may be made to the income of any farm, and to the aggregate wealth of the county. Winter rye,—which is a common and most profitable crop in this part of the State,—is said to be "essentially benefited, by depasturing it with sheep in the spring as well as autumn. By treading the moist earth about the roots of the plant, they aid in preserving the crop from the dangers of the season. Sheep, feeding upon rye, also promote an expansion and more vigorous growth of the roots; the number of sprouts from each germ is much increased; the luxuriant vegetation of the crop, which, by lodging and heating beneath the snow, often endangers the grain, is consumed, and affords a most valuable food to the animals; light and thin soils are considerably manured, and rendered, by the pressure of their hoofs, a more firm and compact texture." "One of the most successful cultivators of rye, I ever knew," says the writer, "habitually allowed his sheep to range upon the crop until the first of June."

We did not intend to go into the subject of the proper food for sheep. The opinion of another, who is better qualified to pronounce one, has been presented, because the raising of rye is very general, and the practice alluded to is worthy of consideration and experiment. Pasturing in summer, and a mixed diet of hay, roots and grain in winter, is well known to be the general food of sheep.

The census of 1850 represents the number of sheep, in the country, to be nearly twenty-two millions, and their value, at the average price of two dollars each, nearly forty-four millions of dollars. Of this number, Massachusetts, (having fallen off nearly fifty per cent. within the ten preceding years,) furnished less than two hundred thousand; and Norfolk County only five hundred and eighty,—fewer than any other county in the State, except Suffolk. And from the best information we can obtain, there are not at the present time, three hundred sheep in the county.

The causes of this marked change in the sheep husbandry of the State and the county may be attributed, by different persons, to various circumstances; but the fact and its consequences are patent to all. If the opinion be capable of proof that an equal number of sheep and cows can be kept on the same farm

that now feeds only cows,—or even but half the number of sheep,—it is plain that an important addition might be made to the aggregate wealth of the county and to the yearly income of every farmer. For there are at this moment not less than ten thousand cows fed on our pastures and in our barns.

But without enlarging upon a topic which commends itself to the consideration of farmers here, and which is receiving much attention elsewhere, we take pleasure in presenting the views of one of the most intelligent members of this society, whose opinions, on all matters relating to farm stock, are universally regarded as of the highest value.

Sanford Howard, Esq., thus writes:—

"Boston, Nov. 19, 1859.

"Rev. C. C. Sewall, Dear Sir,—I submit a few suggestions in regard to a branch of husbandry, which it seems to me has not received that attention in the county of Norfolk its importance demands, viz.: *The keeping of Sheep.*

"I am aware that the wants of the community require a certain number of horses, oxen and cows; but any surplus of grass and hay that may remain after supporting the stock that is indispensable, might be profitably consumed by sheep. No animal is so well adapted to land of inferior quality, and none produces so favorable an effect on the soil. In Great Britain, particularly in Wales and Scotland, there are vast tracts which have been occupied as sheep-ranges, from time immemorial, without any manure except that dropped by their sheep; and yet the productive power of the soil is undiminished. There are some portions of our own country, where sheep have been pastured on the same land for from fifty to a hundred years, the number being now as great, in proportion to the extent of land, as formerly. I need not stop to consider the *causes* of this well established fact.

"But it may be asked—Is the soil of Norfolk County as well suited to sheep as that of Britain? A considerable portion of it is not. Our climate is dry compared with that of the principal sheep districts of England, Wales and Scotland; and the most porous of our soils are much affected by the long droughts which prevail here,—the growth of grass being greatly lessened. Under this characteristic of our climate, some of the

land cannot be profitably devoted to sheep. Experiments in the county of Plymouth, on Nantucket, and in other sections, have shown that even the poorest sand plains are worth from ten to twelve dollars an acre for the growth of wood. There is no evidence that they would be worth this for the keeping of sheep. Consequently, they should be devoted to such kinds of trees as will grow on them to the best advantage.

"The best of our lands are and will be required for cultivation, and for the support of cattle and horses; and the poorest should go to wood. There will still remain a portion, of intermediate quality, suitable for sheep. It might be expedient, also, to turn sheep occasionally upon pastures generally grazed by other animals, in order to improve the quality of the herbage.

"The obstacles to the keeping of sheep in this section, have been the liability of their being destroyed by dogs, and the supposed difficulty of restraining them within proper bounds, —the stone walls which are so common being, in many instances, easily got over. In regard to the former, it is to be hoped that the present "dog law," or other legislative enactments, may afford the desired security; and as to the latter, the addition of one or two narrow boards, of the cheapest kind, to the top of a wall, will form an impassable barrier. A single board will generally answer the purpose, if fastened to stakes in such a manner as to project towards the inclosure designed for sheep.

"The inducements for keeping sheep here may be briefly enumerated as follows: 1. They would afford a better income from some land, than could be obtained in any other way. 2. They can be made to improve some land by the destruction of bushes, brambles and other wild plants, which are followed by grasses, white clover, &c. 3. Mutton can be produced at less cost than any other meat, although when of proper quality, it commands a higher price in our markets.

"An English or Scotch farmer, on coming to this part of the country, expresses his surprise that more sheep are not kept, and that mutton is not more seen on our tables. We eat much greater quantities of pork than the people of Britain, but much less mutton. Singular as it may seem, too, good mutton is dearer in our markets than that of the same quality is in

England. There is no obstacle to the production of it in greater quantity, and it is the opinion of many who have devoted their attention to the subject, that the substitution of mutton for pork, to a considerable extent, would be favorable to health.

"The breeds of sheep best adapted to this section, are those which afford mutton at the least expense. The demand for mutton is increasing, and the nearer the market it can be produced, the greater the saving in transportation. The cost of transporting wool is comparatively trifling; it can be brought from the most remote of our Western States for about a cent per pound, or two per cent. on its value, if of fair quality Merino. Hence those breeds kept chiefly for wool, will occupy the cheap lands of the interior, while the best breeds for mutton will be kept nearer the great markets.

"The first sheep of New England were brought chiefly from England by the early settlers, and were the foundation of the stock bred here for two hundred years. It is impossible to say to what breeds they originally belonged. Their descendants had long ago lost all evidence of any affinity with any British breed. They afforded mutton of medium quality, and wool which answered for the ordinary domestic purposes of the country people, before the modern refinement of taste in dress was introduced. The importation and establishment of the Spanish or Merino breed caused the disappearance of the old English stock, and it is very difficult to find any of them which have not been crossed. But the Merino is now giving way, in turn, to British breeds, in all the eastern portion of the country. This change is caused chiefly by the increasing demand for mutton,—the Merino not being a good mutton sheep. It does not give the thickness and weight of flesh, in proportion to the bone, that is afforded by several of the English and Scotch breeds. When fatted, the amount of fat, especially the internal fat, is too large in proportion to the lean, and there is little mixture of the two; while the flavor of the meat is not as good as that of most British breeds.

"The general division of English sheep is into long and short woolled breeds. Of the former, the principal are the Leicester, (formerly New Leicester, Bakewell, Dishley,) the Cotswold, Lincolnshire, and the Kent or Romney Marsh breeds. The

latter are chiefly the breeds known as Downs, including the Essex or South Downs, the Hampshire, and the more newly formed breeds, Shropshire and Oxfordshire Downs. Some experiments that have been made in England, indicate that the Leicester and Cotswolds will make more flesh in a given time than any of the Downs; but the superior price of the latter in market will nearly or quite overbalance this advantage. It should be remarked here, that the Essex and Hampshire Down mutton commands the highest price, with the exception of that of the Scotch and Welsh mountain breeds, in the English markets. In American markets, the difference in the quality of the mutton of the breeds mentioned is as yet only partially recognized. The principal criterion here, in mutton, as in other meats, is *fatness*, although there are people who judge on better principles. But until a similar standard to that of England is established in our markets, it is probable that the production of mutton from the Cotswold and other long-woolled breeds, will be found most profitable on lands which afford a tolerable supply of grass.

"Still there are many circumstances which affect the relative profit of breeds, and those above mentioned have scarcely been sufficiently tried in this section to determine which are, on the whole, to be preferred. Actual experiments only can settle the question. May we not hope that something will ere long be done in this direction?

"Yours truly, SANFORD HOWARD."

An increasing disposition to raise or keep *superior breeds of cattle, horses and swine*, is a marked feature in the present agricultural condition of the county. We have been gratified to observe remarkably fine farm stock in places where the want of means and facilities for procuring such animals would formerly have been considered an insuperable obstacle to the possession of them. Although the show of blood and grade stock at the late annual exhibition of the society was very good, we believe it might have been increased by large additions from parts of the county which are seldom represented there. The distance from our show grounds, and the injury to which cattle are often exposed when driven far from home, together with the known fact that much greater means and better facilities are possessed

in other parts of the county for procuring fine blood stock, have hitherto operated to prevent the exhibition of many animals that were really of superior character. An arrangement has now been made in the regulations of the society, by which we trust farmers remote from the show grounds, will feel encouraged to exhibit their stock with more freedom, and at the same time,—be enabled to derive benefit from a comparison of their own with other animals. If they do not always obtain premiums,—and the way is open for that to all alike,—yet will they receive a portion of their expenses; and, in addition, all the benefit which others derive from the exhibition. And we believe that whoever exhibits his crops or stock, or any fruit of his skill or industry, at our annual fair, receives, or may receive, benefits greater than any expense he will incur. If the purpose of the society were viewed in a true light, the benefit which all its members obtain for themselves and help to confer on others, would be regarded as of more worth than any premiums ever awarded. Still, to equalize the actual expense incurred, we think it just that some distinction should be made in favor of those who live remote from the place of exhibition, and can only with less convenience and at greater expense, drive or bring animals to the ground.

We understand that, since our last show, a member of the society, who has taken great interest in its prosperity, has imported some of a peculiar and promising character. They are of the Kerry and the Shetland breeds. The description of them will be new, and much interest will be felt to know what are their peculiar characteristics. By permission of the gentleman, who imported them, we have obtained from his agent, the following account:—

Of the "Kerries," Mr. Howard says: "These little mountain cattle are highly prized by the cottagers, and like the reindeer to the Laplander, 'form their riches.' In their native districts, I found the cattle even smaller than I had supposed them to be,—but very useful in that locality,—living where no other cattle I have ever seen could live. In several instances I met with them at elevations of fifteen hundred to two thousand feet above the sea, sharing with the goat the wild herbage

of the mountain's side. Their color varies from black to black and white, brindled and red; but clear black is preferred as indicating the nearest affinity with the original type. I hardly know how to estimate the weight of these cattle, as they are so different from any others I have been acquainted with. The two-year old heifers which I bought for Mr. Austin,—rather larger of their age than the average of the breed,—girted from four feet, five inches, to four feet, six inches. They are large-bodied in proportion to their height, their legs being short and the shank bones very small. Their heads are generally handsome, and the countenance lively, but with a mild expression. The best of them are decidedly pretty. When taken to the low country and supplied with plenty of nutritious food, they become more bulky; but I had no opportunity to see what would be the effect of breeding them for several generations in a milder climate and on a better soil. As illustrative of their hardiness, I will mention an incident. A man led me up a mountain glen to see a lot of three-year old heifers he had grazing there. It appeared a mystery to me how the cattle could get over and around the rough rocks, and obtain a subsistence even in summer. Having noticed that the man had several stacks of hay down in the valley, where was the rude habitation which he called his home, I asked him if he was going to take the Kerry cattle there for winter. He replied, 'No; the hay is for the low land cattle and ponies; the Kerries will winter where they are.' I asked him if deep snows did not fall in the mountains. He said they did sometimes, 'but the snow generally softened after a day or two, and the *cattle would work through it*.'

"I could not obtain any definite statements in regard to the yield of milk or butter of these cows; but a reliable man who kept several of this breed, near Killarney, told me he had often had them give ten imperial quarts of milk, per day, each, and then had a four-year old cow, which I saw, that had afforded six pounds of butter in a week.

"The butter I have eaten in this part of Ireland, both this season and the last, is actually the best I ever tasted. I know not whether the superior quality is attributable to the cows, the herbage, or the mode of manufacture, or all combined.

The butter has a wide reputation, and commands in London an extra price.

"The Shetland heifer is of a dun color, and covered with a thick, soft coat, like fur. This is a very peculiar breed. The color ranges from black to dun in mixtures of black and white and dun and white. They correspond most nearly to the cattle of Norway, and were probably derived from that country when the islands belonged to her, as they did for many years. They are smaller than any of the breeds of the main land of Scotland, or even of those of the Hebrides. Instead of *long* horns, like them, they have *short* horns, as short, nearly, as those of the Channel Islands, commonly called Alderneys. They are very hardy, and their beef is the best of any known in the British markets. The cows give a moderate quantity of the richest milk. They are rather larger than the Kerries. The man of whom I purchased Mr. Austin's heifer, brings thousands from the Shetland Islands annually, fattening them upon a large farm near Edinburgh. He told me that the gentry would give more by a penny a pound for the beef of the Shetlands than for any other."

We have presented this interesting account of these animals with the belief that it is a matter of importance to the breeders of stock in the county, to know what varieties there may be from which to select with most promise of benefit. The peculiar characteristics of these breeds may not render them unsuitable to our climate and soil; and if their butter and meat are of superior value in the markets of London, they may be not less so in our own.

We have been made acquainted, in our excursions through the county, with many examples of industry, economy and thrift, which it is fitting to our purpose, and would accord with our inclinations, to present for consideration, especially to the young. Of one of these examples, we are permitted to give the following sketch:—

"In 1831, I bought a farm of ninety acres, for about one-third of the cost of which I was obliged to run in debt. It had been rented to different individuals for a period of twenty-six successive years, and its condition, therefore, may be easily

imagined. The buildings were old, inconvenient and much out of repair. By slight repairs, (thinking much expense on them would be money lost,) I made them answer my purpose until I was able to build to my mind. In 1837, I erected comfortable, convenient, and substantial buildings—the barn forty by fifty feet, with a cellar.

"When I came into possession of the estate, there was more than a mile of post and rail fence, including my portion of boundary fences, on and around the farm, and all of it in poor condition. I commenced repairing the fences, by digging stones and making walls. I made enough walls yearly, to supply me with material for repairing the rest of my wooden fence, and consequently, I have not bought a rail from that day to this. After removing such stones as could conveniently be dug out with bars and levers, I commenced drilling and blasting. And now my fences are generally of stone wall, and on my mowing and tillage there is not a rock above the surface, and but few within reach of the plough.

"When I bought, there were about sixteen acres called tillage and mowing. I improve about the same quantity now, having increased my fields an acre or more, however, by straightening the fences. The remainder is pasture and woodland.

"At first, but few acres of the mowing could be ploughed without coming in contact with heaps of stones surrounded with bushes; and these had to be removed. I ploughed no more at a time than could be manured and cultivated thoroughly. I first got from the farm about four tons of English hay, and two or three of swale and meadow hay. By buying standing grass, I kept through the winter a horse and five cows. As my crops improved, I was able to increase my stock, and consequently my manure heaps, which, however, before I built my barn, were exposed to the weather until applied to the soil. I now keep a horse, a yoke of oxen, and nine cows, and sell a few tons of hay annually.

"Besides such stones as were suitable for walls, my land was so full of others, that I could in many places fill a cart without moving it. From seventeen acres, I think, more than five hundred loads have been removed. After burying all I could in trenches, under walls and many in other places, I can probably show as large a collection, in one pile, as can be

found in the county of Norfolk. When ploughing green sward, my practice has been to have two or three boys follow the plough, and throw the stones out of the furrows.

"In a communication printed in the *Dedham Gazette*, last August, I was misunderstood to say that one horse had done all the work on my farm to that time: whereas, I have kept oxen for the last six or seven years. My horse, however, did all the work for about twenty years, besides the labor usually required of a family horse, except ploughing green sward in autumn, cross ploughing in spring, and drawing heavy stones for walls. I think, too, that I received quite as much for work done by the horse away from the farm, as I paid for the use of cattle on it.

"My crops have been such as are usually raised on farms in the vicinity; hay, however, has been my principal object. My pastures have very much deteriorated; having no manure to spare, I have done nothing to improve them. About fifteen acres could be ploughed, but a large portion of them is so full of stones, that ploughing would be attended with great expense.

"I always intended to live within my income, and for want of means, my improvements have necessarily been slow. For the first ten years, I sold about fifty dollars worth of wood per year; otherwise, having no resources but my farm, in order to support my family, stock my farm, pay for it, and for my buildings, I have been obliged to study profit, rather than fancy. Having now paid for the farm and buildings, and being free from debt, I consider myself, in one sense, an independent man; and am enjoying that happy state for which the wise man prayed,—possessing 'neither poverty nor riches.'"

This record speaks for itself of the persevering industry, firmness and prudence of its author. And we can bear unhesitating testimony to the present comfort, contentment and respectability of the man, part of whose history it unfolds.

There are many instances, in our county, of men contenting themselves with but few acres of ground, who, by judicious management and great industry, have maintained large families in all the real comfort and respectability which much greater wealth could command, and whose example is becoming of

great service to the community. We have in mind one farmer, who, from about nine acres of ground, of only fair quality, has produced fruits, vegetables, grain, hay, &c., to the amount of about five hundred dollars, this last year, and kept a horse, cow and swine. A near and favorable market enabled him to dispose readily of his vegetables and fruits.

Turning again to the farm already alluded to,—that upon which the greatest improvement has been made by drainage and the removal of needless stone walls, and where an example of hard, unflinching labor, persevering industry and good judgment may be pointed to, with satisfaction,—we award to its owner, Mr. Otis G. Cheever, of West Wrentham, the society's first premium of twenty dollars.

In conclusion, we would remind the farmers of the county, of the dignity, usefulness and happiness of their vocation; of the importance of good tillage, and of thoroughness in all their work; of the necessity of education to those who are to pursue the same calling; of the probability that success will be proportioned to the skill and science employed in it; and of their absolute dependence upon a Divine Providence for the ability to labor, and the privilege to enjoy in peace the fruits of their labor.

"My idea of a happy, good and great man," says one whose words we quote as a fitting conclusion of this report, "is a thoroughly educated and accomplished farmer. He lives true to nature; he is constantly in her midst. With ceaseless vigilance, he observes her beautiful developments and ever changing forms,—her infinite variety and never-failing uniformity. He watches the clouds and the seasons, he surveys the earth, and contemplates the glory of the heavens. He breathes the air fresh from heaven, eats the uncorrupted food of healthful industry, and drinks the water pure from its fountain. Thus living *with* nature and *in* nature, he is led to contemplate the great source of all her manifestations. Like Moses, he sees, and like Enoch, he may be said literally 'to walk with God.'"

For the committee,

CHARLES C. SEWALL.

Statement of Otis G. Cheever, in answer to inquiries of the Supervisory Committee.

The farm which I enter for the society's premium, came into the possession of my father in 1795, and consequently, has been held by the family sixty-four years.

The original purchase consisted of thirty-one acres, and an old house twenty-two by twenty-five feet, without a barn, or a rod of lawful fence on the premises. My father being a carpenter, and doing most of the work in that line for the whole neighborhood, was obliged to make farming a secondary business. And being without a team or farming tools, he was glad to receive a large part of the pay for his own work, in labor on his farm.

From time to time, as he succeeded in saving the means, he added to his lands, so that, at the present time, the farm contains, by estimate, ninety acres, including sixteen of woodland bought since it came into my possession.

It is divided as follows: Mowing and tillage, twenty-five acres; tillable pasture, seven acres; not tillable pasture, nineteen acres; (not tillable now, because I consider it worth more devoted to the growth of wood, than to cultivation;) woodland, thirty-four acres; waste land and swales, five acres. These nineteen acres of what I now consider not tillable pasture, have been, however, ploughed and sowed with winter rye once or twice, and stones enough dug from them to divide the whole into lots, varying from two to three acres each, well fenced with heavy walls, and yet so many stones remain I do not consider the land worth reclaiming, especially since, if let alone, wood grows readily upon it. I think if owners of large farms in this part of the county would encourage the growth of wood on much of their exhausted pasture, instead of mowing the bushes year after year, and then cultivate well a few acres of their best pasture land, it would much more benefit themselves and the public. There are thousands of acres of wet, sour, rocky pasture land in the county that have been burned over, or from which the brush, young pines and other wood have been mowed for fifty years past, which, if left untouched, would now be valuable woodlands.

My mowing and tillage land is uneven, and apt to be washed by heavy rains. The soil is loamy, with gravelly knolls and hollows or runs between. The gravel is sharp and the wet places are mostly underlaid with a hard-pan subsoil. And the whole farm is suited to grasses, rather than grain.

Within a few years I have been doing something in the way of under-draining. I commenced on a bog-meadow of about two acres, near the buildings. I cut it all over with the bog-hoe, burned the bogs, spread the ashes and seeded down with grass. Good crops of hay were taken off for a few years; but the land did not become a permanently good meadow, till I had thoroughly under-drained it, and spread the marl or hard-pan soil taken from the bottom of the drains on the surface, and mixed it with the mud.

The drains are all of stone. Upon this lot are one hundred and thirty-one rods of drains in length. One drain is entirely round the lot, and ten others connect with the central drain; which, for the most part, is still open, because I have not yet found time to cover it, and wait for a season dry enough to clear it out once more. The other drains are upon upland. A wet, miry gully, dividing the cultivated land nearly in the centre, where I had occasion continually to cross it,—but could not do so with a load,—I have now made hard, dry land, by digging a drain forty-six rods in length, and from three and a half to five feet in depth, and wide enough to take in, at least, two rods of heavy wall to one rod of drain. I have drawn in stones as large, each of them, as four oxen could haul; and, in one instance, when I had many such to dispose of, placed two abreast on the bottom of the drain. I usually lay stones of a foot in diameter, or nearly that size, on the bottom, to keep the larger ones above the running water; then fill with smaller stones to within eighteen or twenty inches of the top surface, and cover with poor hay, brush or shavings, before replacing the loam. In digging I use a plough, an ox scraper, and, when very hard and stony, a pick axe and a shovel. A subsoil plough is best to use after the top soil is taken off. The filling is done wholly with the plough and scraper.

The under-drains I have now finished, measure two hundred and twenty-four rods, or more than two-thirds of a mile. In

making them, I have taken more than ninety rods of heavy walls, besides an unknown quantity of stones gathered immediately from the fields.

The digging of these drains has cost from one to three dollars per rod. Of the expense of filling in and covering, I have kept no exact account. I have no doubt that tile-draining would be cheaper on many farms, but when I commenced the work, there were over twelve hundred rods of heavy walls on my farm. The cultivated land was divided into seventeen lots, of from one to three acres each. So I think I may charge a large share of the cost of draining to the removal of useless—worse than useless—walls. Were all the walls removed which really are not needed, it would add more than an acre of arable land to my farm. For I consider that a wall occupies, or overshadows about five feet of land through its whole length, and more than that in the corners of the lot.

There is a cellar under my barn,—thirty-six feet by fifty-eight,—dug in 1848, at which time I might date the most of my improvements.

I now keep from six to ten cows, one yoke of oxen, two horses and six hogs, and make from two hundred and fifty to three hundred loads of manure annually, which is all worked over by the hogs. I do not think the raising of pork, on any large scale, would be profitable, were it not for the manure which is made.

I have tried special fertilizers to some extent, but without much benefit,—except wood ashes, of which I have used large quantities. They have cost eight cents per bushel at the beach, and were drawn eight miles. But since other farmers, living nearer, have discovered their value, the price has advanced, so that I cannot now afford to use them. I believe farmers in this part of the county can make their own manure cheaper than they can buy it.

My cattle are all stabled during the night through the year. In the season when fed with green crops, of which I raise a large supply, they are stabled nearly three-fourths of the time. The cows are milked at half past five every afternoon, and at about the same time every morning through the year. Pursuing this course, I must, of course, use a large quantity of absorbing material in the hog pens, and cart out manure

frequently. Usually it is all removed four or five times, instead of once a year, as formerly.

In the condition of my pastures, I could keep only three or four cows, but by raising green corn, and feeding, in connection with it, hay and grain, I have kept double the number, and, at the same time, have enlarged my manure heap, and increased the capabilities of the farm. I plant corn for fodder in drills eighteen inches apart, and use less seed in the row than is common with other farmers. I spread all the manure and plant with an Emery's seed-sower. This costs $14, but its cost would be repaid every year, if only used to plant corn fodder; and besides this, all other small seeds, such as turnip, cabbage and beet, and beans, pease, &c., can be planted with it.

I have fed mowing grounds in the fall but little, and am abandoning the practice altogether. I mow from sixteen to twenty acres of English grass, and get from twenty-four to thirty tons of hay. I seldom cut less than one ton, and usually not more than two tons per acre. I use top dressing considerably; spread eighty loads on four or five acres of mowing land last fall, but am not fully decided as to its economy. I should be governed by circumstances in the use of it.

I have sometimes seeded down land with rye sown in the fall, but usually with oats in the spring. My success has been good in both ways, especially when I have spread fifty or sixty bushels of ashes to the acre, and worked them in with the seed, which is the best way of applying ashes on my land. The grass seed used has generally been one bushel of redtop, ten or fifteen pounds clover, and a peck of herds-grass per acre. But this is too light seeding, and more seed will be used in future. Bushing, rolling, and a clean picking of the stones have always followed seeding, so as to make smooth work for the scythe and horse-rake. A mowing machine could not be used on my fields, until they are larger than they are now. All the hay is usually consumed on the farm; none has been sold from the farm for ten years past.

In the winter, I have sometimes sold milk, carrying it six miles two or three times a week. But it is preferable to make butter, when the work can be done in the family, and without extra help. My butter has usually been sold for twenty-five cents per pound.

I do not raise any stock, but depend on purchasing a supply from others. I purchase such cows as may be for sale, often those that are unruly on farms not so well fenced as mine. When past seven or eight years old, they are usually fed highly, till in good condition for the butcher. They have often been milked, however, every day for two, and even three years. By following this method, I do not get many extra cows, but while I keep them, get a large average amount of milk per year, usually six to eight quarts per day from each cow, during the year, which is much more than cows ordinarily yield, going dry three or four months. I certainly would not recommend my practice for general adoption, but somebody must fatten the old farrow cows, and I think my method is a good one for that purpose.

My hoed crops, for a few years past, have been potatoes and garden vegetables. Have sometimes raised cabbages to the value of $90; pease, $80; sweet corn, $20; and beets, beans, &c., in a similar proportion. Have not made this sort of cultivation a large business, but preferred such crops to Indian corn.

From somewhat less than an acre of ground I have, in one year, taken over two hundred dollars worth of pease, beans, turnips, cabbages, beets, squashes, cucumbers and potatoes. The turnips followed the pease on the same ground. But the past year, in consequence of the distance from market, and the extra labor and care required, I have mostly given up the raising of sauce, and have had under cultivation, corn, two and a half acres; potatoes, two and a half; French turnips, half an acre; cabbages and fodder corn, half an acre. Potatoes are planted on sward land, ploughed the previous fall, manured lightly and ploughed again in the spring. They are planted in pieces and in drills, putting the pieces eighteen inches apart; in this way have fewer small potatoes than when several pieces are put in hills further apart. Have been much troubled with rot some years, but probably not more than other farmers, particularly since I have raised Davis' seedlings and Danvers seedlings for a main crop. Rot here has invariably been greater in potatoes raised on low, moist, loamy soil, and least in those raised on dry, gravelly hills. I raise the purple top, strap-leafed turnip, and a superior white, French turnip.

The latter are sown about the first of July, on land that was well manured in the spring, and has received two or three ploughings. Raised two hundred and fifty bushels on less than half an acre. This may not be a great crop, but it is about as much as is profitable for a table turnip. I sold seventy-five bushels to neighboring families, and fed the remainder to my cows and oxen. The strap-leafed I sow about the first of August, on sward land, ploughed after haying. Raised one hundred and thirty-three bushels last year, and fed to the cattle. I have never found butter injured by feeding cows with turnips or the leaves of them. Usually withhold turnips for two weeks from cattle going to be slaughtered.

Of fruit, I have not much in bearing. Have set out about one hundred apple trees within a few years; these are doing well for their situation. I made a mistake in not setting them all together, on some of my best land. They are now scattered about so much on rocky hill-sides, and by the sides of fences, that I cannot take that care of them which they need. I do, however, keep the ground around them ploughed and planted most of the time.

I use Nourse, Mason & Co.'s "deep tiller" ploughs,—Nos. 37, 32 and 31. Each lot of land receives one thorough ploughing every time it is under cultivation, having a man to follow the plough, and pick off or dig out the stones. This is the way to dig out small stones most easily.

My woodland helps to give employment to men and teams in the winter season, when New England farmers usually have but little work to be done on the farm to advantage.

I have never kept a strictly "farm account." But from my cash book, I take the following items of receipts and expenditures relating to the farm:—

During the year ending September 20, 1859, I fattened and sold

1 yoke oxen and 9 cows, weighing 6,444 lbs., .	$512 74
6 hogs, weighing 1,809 lbs., ...	151 54
1 hog, salted for use, 250 lbs., ...	20 00

Average weight of cows 500 lbs.
Average weight of hogs sold, 301½ lbs.
Average weight of oxen, 1,944 lbs.

During the year ending April 1, 1859, sold

Milk, amounting to	$233 32
Butter, 1,741 lbs.,	441 39
Potatoes, 133 bushels,	105 50
Cabbages,	48 60
Turnips,	35 57
Beets,	9 04
Eggs,	9 00
	$1,566 66

During the same year, ending April 1, bought

Indian meal and corn,	$373 41
Shorts, 8,139 lbs.,	107 22
Oil meal, 425 lbs.,	8 63

The greater part of the labor on the farm is done by myself and my son. And the work in the house is performed almost entirely by my wife and daughter. I have sometimes hired a man by the month in the summer season. Last year, hired for five and a half months, at a cost, including board, of $133.

This year, we did our work till haying time, with the help of an aged friend, who has boarded with us much of the time for several years. To him our cultivated fields owe most of their freedom from weeds, he being very sensitive about allowing weeds to go to seed. Since haying, while making improvements on the farm, digging forty-five rods of drain and clearing three acres of land of rocks, I have hired one man eighty days, at seventy-five cents per day, with board, $60. Total expenses, $682.26.

I regret that a larger number of the committee could not make it convenient to visit the farm, not to be shown a "landscape garden," or a "country residence," that is in the least comparable with hundreds of beautiful estates to be found scattered all through the lower towns of the county; but a farm brought, by means within itself, to a fair state of fertility, from a beginning so small that a friend of my father's, when he heard that he had bought the place, said to him, "What in the world did you buy *that* for? It won't produce enough to keep a goose."

Otis G. Cheever.

Wrentham, November, 1859.

PLYMOUTH.

Report of the Committee on Farms.

In past years it has not been the practice of the society to appoint a special committee on farms, but to make the labor of reporting on farms incidental to the work of other committees. This subject, however, is deemed of too much importance to be treated in this manner, and accordingly, a committee has been selected for this particular purpose.

That there is no general want of interest in the success and usefulness of the society among the farmers of our county, is evident to the most casual observer. A reluctance, however, on the part of those most deeply interested in the advancement of agriculture, to furnish to the society that information necessary to its usefulness, is but too apparent. The cause of this backwardness to communicate information which would be so interesting to all, is, perhaps, not difficult to be accounted for. It is the practice of most of those who cultivate the soil, to carry on the complicated business of their farms without much regard to the exact expense of each crop cultivated, and each animal kept; it is considered sufficient, if the whole farm has produced enough to enable them to live comfortably, without troubling themselves to ascertain what part of their labor has paid its way, and what has not. Now, when the society offers a liberal premium for the best cultivated farm for a period of four years, on condition of an exact report of the state and value of the farm and every thing that pertains to it, the crops, mode of cultivation, expense of each, and the general management of the whole, it is not surprising that only a few are found who are willing to respond to the call; this would involve an entire change of habit. That this close attention to details, however, is necessary to any success that is not merely accidental, and that that which is necessary to the prosperity of the society is necessary to the prosperity of each individual farmer in the county, must be evident to all who seriously reflect on the matter.

The committee on farms have to regret that only two entries have been made for the society's premium; but they cannot but indulge the hope that many farmers will be found, although

not competing for a premium, who will be willing to communicate in writing any information which they may have that will be advantageous to be known. If there should be those who would prefer to have the committee call upon them, and make such mention of their operations in the annual report as may seem proper, the chairman would be very glad to undertake the performance of so agreeable a duty.

The two farms which the committee have been called upon to visit are owned, the one, by Mr. Ephraim B. Thompson, of Halifax, the other, by Mr. O. H. Shaw, of Middleborough. The farm of Mr. Thompson is very favorably situated for the experiment which its owner has undertaken; and there is no reason why he should not have, at the expiration of four years, a farm showing as great a degree of improvement as any other in the county. It has a variety of soils, is conveniently divided into upland and lowland, entirely free from rocks, and is naturally well adapted to the mixed husbandry generally practised in our county. It has only those drawbacks which are so common to almost all New England farms; it is for the most part poor, through long cropping without a sufficient application of manure. When Mr. Thompson has finished his draining operations, he will have an abundance of meadow that will enable him to keep the stock necessary to produce the manure which his land so much needs. There is one consideration which ought to be very encouraging to Mr. Thompson; all the improvements which his farm requires, will immediately pay. Mr. Thompson's experience and prudence renders success in his business certain.

The soil of the farm which Mr. Shaw has undertaken to bring into a fertile condition, is not naturally poor, but is reduced to the lowest degree of unproductiveness by the improvidence of man. The most discouraging feature about the farm is the large rocks which cover a large part of the cultivable land. We suggested to Mr. Shaw to dig a hole near each, and drop them below the reach of the plough. We hope he will be able to get rid of them without having it cost more than the land is worth. But Mr. Shaw's courage and zeal seem to be equal to the exigencies of the case, and will, we doubt not, eventually triumph. His experiment in draining bog-meadow we consider very important, not only to himself, but to all his

neighborhood, where there are hundreds of acres of boggy land, covered at present with useless wild grapes, but which will become the best of meadow land by the removal of the stagnant water with which the soil is saturated. In this experiment Mr. Shaw will surely succeed.

Meanwhile we would ask the farmers of the county to inquire into the proper mode of charging and crediting farm receipts and expenses.

CHARLES BURTON, *Chairman.*

RECLAIMED LANDS.

WORCESTER.

From the Report of the Committee.

From a thorough examination of the premises, your committee believe Mr. Chamberlain's statement to be substantially correct, and that his improvements have added much more to the value of his farm than they have cost him; and they further believe that an annual dressing of good soil or compost, a judicious management of the water, and occasionally a slight harrowing, will continue to produce him good crops, unless he should attempt to crop too heavily.

We therefore award to Mr. Chamberlain the first premium of ten dollars for reclaiming one acre of wet swamp-meadow land, for a period of three successive years.

REJOICE NEWTON, *Chairman.*

Statement of Curtis Chamberlain.

I commenced improvements in 1840; ten or twelve acres in the whole, and one for which I claim premium. About one-half of it was sprout land, where a growth of large wood was taken off, and the other half was cleared, bogged, and burned over, and had been mowed about thirty years. It was all worn out, and was covered with white moss, bushes, and many old stumps. Generally, I have subdued about one acre each year, when the

season was good and dry enough. In the first place, I ditched and drained it; then cut off the bogs and dug out the stumps, and burned the turf that was not wanted to level up with; then covered over with gravel two or three inches thick; spread the ashes, and spread on a good dressing of compost or barnyard manure, and sowed six quarts of herds-grass, eight quarts of redtop, and four pounds of clover seed to the acre. I like to seed about the first of September, if I can get ready; but if I do not get ready until the last of the month I should not sow clover until spring. Bush and roll it. But with the sprout land, I cut the bushes in July, and set fire to them about the first of August, and keep it burning night and day by cutting out the loose roots and stumps and putting them on the hard ones until the middle of the stump is burned out. Then I cut out the roots and put them on others; thus continuing until the piece is cleared of roots and stumps; then I plough the higher parts, and level up the low places, spread the ashes, and sow the seed as before stated. Some pieces I have planted one or two years with corn or potatoes, which I think is the most profitable.

I have ploughed most all of those pieces which I reclaimed before 1850, and planted with potatoes and corn, beans and pumpkins, with good success, when the worms did not destroy the corn. Turnips usually do well. Oats have large straw, but blast. I had some good winter rye this year, which did not blast. I sowed some once before, which produced large straw, but no grain.

I like to top-dress once in two or three years, in October, and sow a little more seed if it is wet weather; if not, sow it in March on the snow. But I prefer ploughing once in six or eight years—seeding to grass in August. I like cutting the grass early, and cut two crops for making milk.

Clearing and preparing the sprout land, I think cost from $70 to $90 the acre; the other parts from $60 to $70 the acre. I spread on, once in two or three years, a thin coat of gravelly loam, and top-dress with manure.

I generally dig ditches about five rods apart and three feet wide at top, one and a half at bottom, and two and a half deep. The main ditch for carrying off the water, runs on two sides of the meadow, is about 150 rods in length, five feet wide at top, two

and a half at bottom, and two and a half feet deep. The length of all the ditches is between four and five hundred rods. I think the muck taken out will more than pay for the digging.

The piece for which I claim a premium I commenced improving in 1856, and sowed a part of it with grass in 1857. The remainder I planted with potatoes, which did first-rate, taking about fourteen hills for a bushel. That fall I prepared the remainder, and planted both parts with potatoes the next season, but where I planted two years they were smaller. I should think that the whole piece averaged about twenty-three or twenty-four hills to the bushel. Last October I ploughed the whole piece, and sowed the whole with grass seed, and a part of it with winter rye. The rye was very good. I think that the reclaiming of this piece did not cost over fifty dollars to the acre.

None of this land was worth more than $15 or $20 per acre, for any other purpose than reclaiming, when I commenced on it.

Southborough, 1859.

UNDERDRAINING.

ESSEX.

From the Report of the Committee.

For the best conducted experiment in underdraining land, regard being had to the variety of soil, subsoil and other local circumstances, premiums to the amount of twenty-five dollars are offered by the society.

Your committee have found much satisfaction and instruction in their inquiries and observations on this subject. Although very few entries have been made for the premiums offered—all those who have experimented feeling themselves to be learners, rather than teachers of the art of underdraining—still, in addition to viewing what has been done, we have received statements from several of our best farmers, all of which are annexed, that will be found highly useful, as guides in experiments of this character.

Among these, there is no one that covers so large a space as that of George B. Loring, of Salem, who, having abundant leisure and skill in the use of the pen, will best describe his own works. If we do not mistake, it will be in his power to add greatly to his very valuable farm, by operations in underdraining.

Our attention has been called by James Stevens, of Andover, to draining operations on about two acres, which, if he does not mistake, have been doubled in value by his drains.

Some of a different character were presented to our notice on the ancestral Putnam farm in Danvers, by William R. Putnam. Mr. Putnam is a good farmer, carefully understanding what he does. We have confidence to believe that he will find his reward in his experiments well begun, and in due time will be able to instruct his brother farmers which of the several modes of draining (for he has tried them all) is best to be adopted.

It is not strange, when experiments are found to have cost more than they are worth, that experimenters are slow in their commendation of such experiments. All agree that drains, judiciously laid and kept in good order, improve the land and greatly improve their products.

In view of all we have seen, we are of the opinion that the experiments of Messrs. Loring, Stevens and Putnam, have been "best conducted," and recommend that the premiums be awarded accordingly.

JOHN W. PROCTOR, *Chairman.*

Statement of George B. Loring.

I enter for premium five and one-half acres of land, being one of the lots which I have endeavored to improve by thorough drainage. The land is nearly level, and in addition to the water falling upon it in the form of rain and snow, it receives the drainage of a considerable extent of hill-side and slope by which it is surrounded. The subsoil is a stiff, tenacious clay, very retentive of water, extending to the entire depth of the ditches—how much further I cannot say—without any strata of sand or gravel. The soil lying above this is a rich, dark loam, from one foot to eighteen inches in depth.

The field had been thoroughly and carefully cultivated, for many years previous to coming into my possession, by some of the best farmers in our county. It was always a difficult piece of land to till, owing to the surface water, and to its hardness in a dry season, and its coldness in a wet one. Some form of drainage had always been found necessary for its cultivation; and through its entire length ran a deep and wide, open ditch, on each side of which the land was laid out in beds about forty feet wide, raised in the middle as high as the plough could raise it, and divided by deep, dead furrows.

I determined to drain it in the autumn of 1857. The crop of that year had been about a ton of hay to the acre—of a poor quality. The land was filled with water grasses and various aquatic weeds, and during the season to which I refer, it was seldom free from stagnant surface water, collected in the hollows and dead furrows. In many portions of the field the cultivated grasses were entirely destroyed.

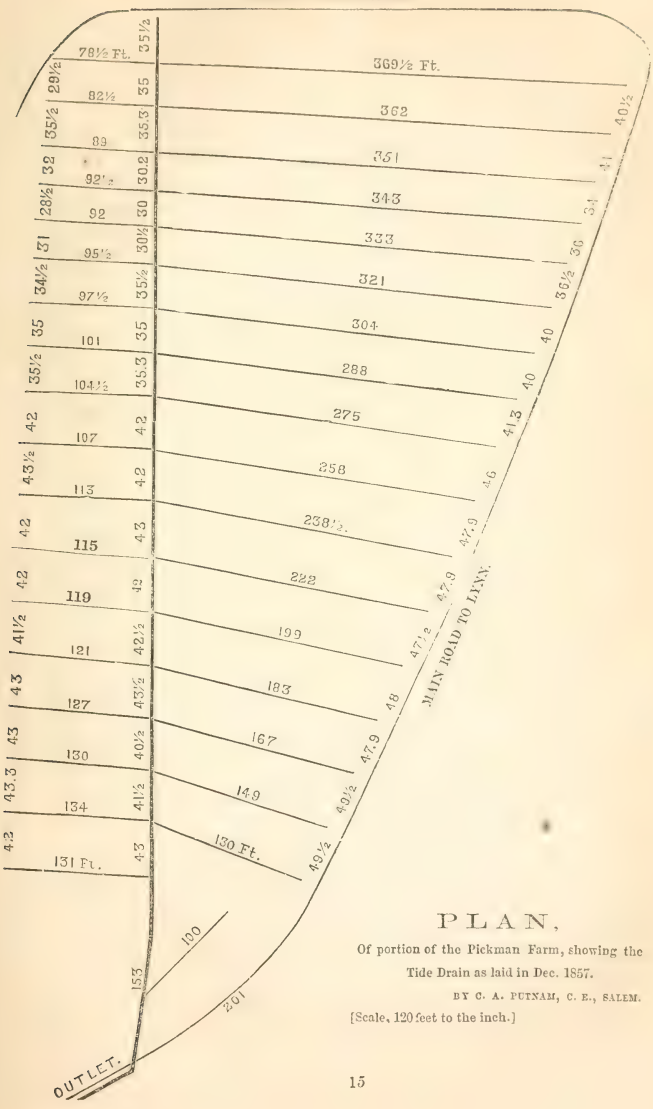
After the hay crop was removed, I ploughed the field, for the purpose of manuring and seeding again to grass; but I found at once that such an operation would be utterly useless. The soil of a large section was stiff, cold and clammy, and in spite of the high manuring to which it has been subjected, it had still that slaty color which distinguishes a water-soaked earth from the rich brown of well-tilled and well-drained loam. It was evident that all my manure and labor would be wasted, even in attempting to raise a grass crop, that hardiest of all products, just as manure and labor had been previously wasted in the cultivation of corn and roots on the same field, on account of the disastrous effects of water. I therefore abandoned my original plan; and as the field lies very near my barnyard, in a convenient proximity to the manure heap, and at such a distance from my farm-house that no time would be lost by the laborers in going to and from it, I concluded to devote it to constant cultivation. For I have always found that a farmer cannot afford to transport manure to the distant fields of his farm, while his grass lands lie at his threshold; neither can he afford to employ his laborers in long journeys from their meals to their labor, especially with the hoe and weeder.

The operation of draining the field commenced Dec. 8, 1857. The open ditch was first cleared to a depth, at the head, of three feet, and sinking five feet eight inches at the outlet of the field. In no place was the fall less than three inches in one hundred feet. Having thus prepared the bed for the main drains, I directed side drains to be dug, running at right angles with the main, commencing at a depth of two and one-half feet, and running to the depth required at the junction with the main. The side drains were dug at different distances from each other, according to the quality of the land—in some cases forty feet apart, in others less, as shown on the plan. (*See next page.*)

When the ditches were laid open throughout the field, I commenced at the upper portion to lay the tiles, taking care to keep the laying of the laterals and the main uniformly finished as I advanced in the work. The main drain consists of two rows of four-inch tile laid contiguously. The laterals consist of two-inch tiles. I used mostly sole-tiles; using a few shoe-tiles only when the manufacturer's stock of sole-tiles had failed. The drains were filled as fast as the tiles were laid.

Although the weather was unusually mild for the season, while the work was going on, still the frost of December increased the difficulty of working in the stiff, heavy clay, and added to the expense of the operation. The job was finished, and the drains covered against freezing on the 24th. The expense of the work was $51.25 per acre, exclusive of hauling the tiles from Manchester, which was performed with my own teams. The cost of the four-inch tiles was $40 per thousand—of the two-inch tiles $12 per thousand. I contracted for digging the drains at 27½ cents per rod, and paid an expert ordinary day's wages for laying the tiles. The joints of the tiles were snugly covered with wisps of meadow hay laid compactly over them—a small item of expense which I have not included in my estimate per acre. As the field is very flat, I was obliged to employ a civil engineer from time to time to give me the levels of my main drain, the flow of water not always being sufficient to guide me.

And now, having described the process, I desire to give the result. This field, which had long been almost incapable of



PLAN,

Of portion of the Pickman Farm, showing the Tide Drain as laid in Dec. 1857.

BY C. A. PUTNAM, C. E., SALEM.

[Scale, 120 feet to the inch.]

cultivation, which was always flooded in the spring, and parched in dry, hot seasons, which was disfigured by an open ditch, and by ridges and dead furrows, which had been for half a century a reproach to the adopted system of farming, began at once to improve in condition and appearance. Even during the winter of 1857–8, the water was carried off from it to a degree never known before, and although it was by no means brought to a proper condition, still the ploughing in the spring of 1858, and the cultivation during the season, were very materially improved over previous years.

In the season of 1858 the crop upon it was corn. The month of June was very wet, and in some of the deepest hollows, where water had stood for years, the corn was killed. Perhaps two thousand square feet of land suffered in this way, for the loss of which I was more than compensated by the gain of between five and six thousand feet, previously occupied by the open ditch. As the season advanced, the rains of August and September were carried off more rapidly. The crop of corn was sixty bushels to the acre, including the land where the yield had been destroyed or reduced by water. At the close of the season, in November, 1858, I laid a thousand feet of intermediate lateral drains through the lowest points of the field, at an expense of $20. I also commenced subsoil ploughing, but was obliged to abandon it on account of the early freezing.

The spring of 1858 found the land in much better condition than it was the year previous. The winter and spring rains soon vanished from its surface. The loam was more friable; the clay subsoil, as expressed by the workmen, was more brittle. It was ploughed and manured in May, carefully cleaned with a grubber, (for I was aware that the cultivation of the previous year had not eradicated the twitch grass,) and sown with mangolds, ruta-bagas and carrots. The soil was easily worked, and the rows placed two feet apart, to allow the use of a horse-hoe and grubber, an excellent labor saving implement for root culture, purchased for me in England by Mr. Sanford Howard. The seeds germinated rapidly, indicating an increased warmth in the soil. The plants had become visible in long green lines across the field, which had been brought by repeated ploughings to an apparent dead level, when, on the 17th of June, the effects of thorough drainage were fairly tested. It will be remembered

that at that time we had a most copious rain—two inches and a half in twenty-four hours. On the morning of the 18th the centre of my field presented the appearance of a lake, and I began to fear that I was again to lose my crop—at least that portion of it covered by the flood. In twelve hours, however, the water was gone, and, with the exception of a spot about four feet square, no vegetation on the field suffered in the least. After removing the crop this autumn, a portion of the field was subsoiled, but more of it was ploughed in ridges, backing each furrow for the more perfect action of the frost. I propose to finish subsoiling in the spring. I found, on ploughing, this autumn, great uniformity in the quality of the soil throughout the field, and wherever the clay was turned up by the plough, it had lost its tenacious texture. The subsoil plough penetrated with more than twenty per cent. less draught than was required the year before.

In speaking of the crops raised upon this piece of land during the two years since it was underdrained, I have referred to the corn crop of 1857 and the root crop of 1858. An extended comparison of these two crops may not be inappropriate here, or uninteresting. I do not pretend that sixty bushels of corn to the acre is such a crop as our farmers ought to raise; still it is above the average. And as my land was not suited to corn, naturally, and had not been drained a sufficient length of time to adapt it to any crop, I must make a proper allowance. I should have stated that four and a half acres of the field have been cultivated since the drainage—one acre still being continued in grass, having been laid down the year before the draining was accomplished. On these four and a half acres there were raised two hundred and seventy bushels of corn, for the expense of raising which, I will accept a very common estimate, and allow that it was fully repaid by the fodder. I am by no means sure that the fodder on an acre of corn will pay for the ploughing and labor of manuring, and planting, and hoeing, and cutting, and housing, and husking, to say nothing of the cost of the eight or ten cords of manure which must be used in the cultivation. I have never found that it did pay these expenses. Still, in making the comparison, I will grant that it does, and consider two hundred and seventy bushels of

corn, at a dollar a bushel, as the net proceeds of my four and a half acres of land.

On this same land, this season, I have raised eight hundred and fifty bushels of mangolds and sugar beets, nine hundred bushels of ruta-bagas, and eighteen hundred bushels of carrots, nearly eight hundred bushels of roots to the acre. The ruta-bagas and beets were fair, but the carrots were very large, long and heavy, and constituting by far the most valuable portion of the crop, and showing, by their length, the advantage of thorough drainage for this useful and important root. Estimating the mangolds, sugar beets and ruta-bagas at a shilling a bushel, and the carrots at eight dollars per ton, the value of the crop is six hundred and fifty-one dollars. As I have not calculated the value of the manure in the cultivation of the corn, so I will omit it in considering this root crop; and I shall estimate the expense of ploughing, sowing, weeding with horse and hand power, and harvesting, at two hundred and fifty dollars, (a large estimate, considering that the work was done in mornings and foul weather, mostly by a force necessarily employed in haying,) I have then four hundred dollars in roots, as a comparison with two hundred and seventy in corn, after giving corn all the advantage that has ever been claimed on the score of fodder. Of the value of the two crops as food for cattle, I leave others to judge—at the same time urging upon all our Essex County farmers, large and small, the importance and profit of roots in every good system of husbandry—especially carrots, to the culture of which our soil seems to be peculiarly adapted.

But to return to the subject immediately before us—thorough drainage. I am aware that there is much to be learned upon this matter, still; and that notwithstanding the attention which has been bestowed upon it elsewhere, and the treatises which have been written upon it, we are yet in the very commencement of the business, and have not yet adopted it as a part of our system of farming. We are still discussing how the water enters the tile; whether thorough drainage is profitable; whether it is adapted to our climate; whether stone drains and open drains are not just as good, and perhaps cheaper and better than tile drains; whether, after all, thorough drainage is of any service to us. I hear these questions discussed daily by

our most intelligent farmers; and I am well aware that drainage with stones, as preferable to all other methods, has still many advocates among us.

Now this is not the time and place to enter into an elaborate treatise upon the courses of the waters, and the character of soils, and the discovery of thorough drainage, and the precise angle at which the laterals must enter the main drains, and the proper shape of the tile, and the water levels of our hills and valleys, and the dip of the strata through which drains are to run. The steps which led to thorough drainage, and the theory upon which it is based, are valuable and interesting, like the foundation and development of every great discovery. The careful study of this cannot be too highly recommended to our farmers. "Farm drainage," an elaborate and interesting work on this subject, by Henry F. French, containing the whole matter in a most attractive form, should be a text-book in the hands of every farmer. In this work, the subject, so far as at present investigated, is exhausted.

But there are a few practical questions connected with the case which I report, which perhaps may be profitably discussed.

I am often asked, "Is thorough drainage profitable?" This depends very much upon the location and quality of the land. Upon the location: The field, for instance, which I enter for premium, lies, as I have said, in one of the most convenient sections of my farm, and is almost indispensable to an economical production of the crops I need. I have other land lying near, but it is occupied by orchards, or is so broken by hills that cultivation is either difficult or impossible. Here were five and a half acres, unoccupied, at my very door, almost useless, unfit for grain or roots, and unable to bear grass of good quality and quantity for any series of years. It is a bed of clay, upholding a quality of soil which only required warmth and dryness to become highly fertile. Science and the experience of others taught me that such a subsoil, once disintegrated, would become of the highest value for tillage,—that droughts would not parch the crops, and that in its bed the growing plants would find an abundance of nourishment. The superficial cultivation which it had received, had produced no permanent benefit. The manure of fifty seasons had increased the depth of the soil, but had not served to warm it. There it

lay in that solid basin of clay, inoperative, lifeless, and constantly borne away by the streams which ran along the dead furrows, and down the great open canal, into the highway, for the benefit of no man. I found that the expense of ploughing such land was too great. The open ditch was an obstacle, and the beds were troublesome. The process of ploughing was slow and heavy: and the result was often attended with great uncertainty. As a good farmer who had formerly rented the farm, said to me, "If I ploughed that field too early in the spring, I lost my crop, and if I ploughed it too late, I could do nothing with it." It is to be presumed that this is not the only piece of land in Essex County, of this description.

Now, without entering into a precise calculation of the return I have received for the investment of fifty dollars an acre on these five and a half acres—a thing which is impossible—it is very easy to perceive that the crop of the present year alone, increased as it has been, and in some portions of the field insured by the drainage, would go far towards my remuneration. I now have a good field, whereas I formerly had a poor one. And it is hardly necessary to demonstrate to any farmer that an expenditure of fifty dollars on an acre of land, advantageously situated and of proper quality, is not an extravagant or unprofitable outlay. Were my land the only specimen of drainage in this country, it might be necessary for me to be more accurate; but the operations of Mr. Johnson, of New York State, the father of thorough drainage among us, and of some of the best farmers in our country, who expend nothing on their farms without a fair prospect of reward, are a sufficient guaranty that this mode of improving the land not only pays well, but is indispensable to good agriculture.

I would not be understood as saying that an indiscriminate application of thorough drainage to all soils is to be recommended. There are soils which do not require drainage, though not so frequently met with as many suppose. Heavy clay soils are a bane to the farmer without it—a blessing with it. There is a large quantity of what is called cold, springy land—land in which the water, percolating from the hill-sides is caught and held, and in which the springs thus fed are constantly seeking an outlet on the surface for the want of any other mode of escape, which would be made highly valuable by thorough

drainage. I know many acres in this county, composed of a thin layer of loam and humus, upon a shallow bed of clay, beneath which is found a deep stratum of gravel. The clay is so tenacious that a great portion of the surface water never penetrates it into the gravel filter beneath, but lies stagnant on the level places, and flows down the slopes until the valleys are constantly inundated. They yield but little. They need only thorough drainage to become warm and fertile. Swamp lands require a different mode of drainage; and although some may differ from me, I doubt if thorough drainage is applicable to such lands. A swamp is usually composed of a collection of decayed vegetable matter, of greater or less depth, occupying what may once have been the bed of a lake or pond. Through it or from it usually flows a stream, and the land itself may almost be said to be afloat. The subsoil is very often below the reach of any ditching. The level of the water may be governed by the outlet. In its natural condition, the water is usually almost as high as the level of the land. This level of the water may be reduced in proportion to the fall which can be provided at the outlet by digging—seldom more than two or three feet below the surface of the soil. If, therefore, by a proper arrangement of open ditches and a sufficient outlet, the water is caught as it flows from the hill sides, and is conducted out of the swamp, you will have just as many feet in depth of a porous, peaty soil, as you have reduced the level of the water—no more —perhaps, and probably less, on account of the settling of the swamp, as the water is drawn off. This soil, composing islands, so to speak, between the open ditches in which water stands, never loses its porosity; and it usually requires some application of gravel or clay upon its surface to bring it into a condition fit for cultivation. It has no surface water, and it has no subsoil that has been reached. It is in reality agriculture afloat, and it must remain afloat so long as the reservoir of water beneath it is supplied, and not emptied. I speak of swamps as we usually find them in our own county, and in many parts of Massachusetts. I do not think tiles or blind drains of any form are applicable to such tracts of land, for I consider a firm subsoil as almost indispensable to the proper use of tiles, not only on account of the solid basis upon which they ought to lie, but on account of their capacity for discharg-

ing water. I have seen many a stone drain sunk in a swamp, carrying down many a dollar with it. If such spots are to be drained at all, let it be done as the Venetians drained the lagunes upon which they built their city—by canals, and not by sewers.

With the exception of certain portions of swamp land lying upon a firm subsoil, shallow swamps, as they may be called, furnished with a rapid outlet, and lying in some convenient locality for cultivation, few swamps can be reclaimed and subjected to thorough drainage.

There can be no doubt that all lands in this country so situated as to pay for careful cultivation, may be profitably underdrained whenever they require it. And all land requires draining where "stagnant water" either "in or on the soil, impedes the growth of all our valuable crops."

I am frequently told that nature has provided most of our farmers with materials for draining close at hand, in the stones of their fields, and that under such circumstances tiles are an unnecessary expense. I am aware that it is a good plan to bury the stones which interfere with cultivation. But I doubt the economy of attempting to convert them into drains, except for the purpose of constructing a large free water passage, tapping a copious spring, or furnishing a culvert for a rapid stream. I should never expect to thorough drain with stones, and should consider it a misfortune to find enough in my land to tempt me to use them. I should certainly never haul them upon the land for the purpose of constructing a drain, and if I found them there I should be tempted to haul them off rather than use them. Stone drains cannot be constructed as economically as tile drains. They require vastly more digging, and they are bulky and heavy to transport. They cannot be laid so as to prevent the particles of earth from entering their crevices, and their walls offer retreats for moles and mice too comfortable to be neglected. Owing to their liability to be obstructed, they are not permanent, and, except as conductors for rapid streams, I doubt if they are ever effectual. In the field which I have described, there are 7,562 feet of drains. The work, began on the 8th, was finished on the 24th of December—sixteen days, including Sundays and foul days. Let any one compute how long it would have taken to haul stones enough for these

drains, even had they lain immediately about the field, and he will be able to judge of the comparative economy of the two systems. And considering the character of the soil and the level of the field, I have no doubt that stone drains would have been ere this inoperative. I doubt if clay beds can be properly drained by any such method. I have in my mind a beautiful meadow which was drained nearly thirty years ago with stone drains, and brought for the time into fine grass land, but which is now rapidly returning to its original aquatic vegetation. The drains are evidently obstructed. The work is evidently a failure. And why?

In answering this question, I am brought to the consideration of a point frequently brought forward in all discussions upon thorough drainage with tiles. Place a tile into the hands of any man, or show him a tile-drain laid and ready for covering, and he will almost invariably ask you how the water enters the pipe. Mr. French in his work seems to adopt the theory of Mr. Parkes, that five hundred times as much water enters a drain at the crevices or joints, as through the pores of the tile. This may be so. But one thing should be remembered—that no crevice should be large enough to admit particles of earth with the water, if the water passage is to be kept free from obstruction. The great advantage of tiles over stones is, that they strain the water out of the soil without admitting any earthy particles along with it—an operation impossible in a stone drain. And unless the crevices or joints are close enough to perform this duty, the drain must be a failure. Now take any number of feet of two inch pipe properly laid, with the joints carefully adjusted, and the space occupied by the crevices is very small in comparison with cubic inches of the bore. Yet from this pipe will be discharged at times a stream of its full capacity. Would not crevices large enough to admit this volume of water endanger the drain? I have no doubt that tiles act as strainers all along their course. The insinuating power of water in the soil is well known. It pursues its course in obedience to the laws of gravitation with a persistency almost unequalled. The drop that falls upon a hill-side commences at once its journey to its level, and nothing stops it. No soil is so hard that the hidden vein may not be discovered winding its way through it on its mysterious errand.

It seeks the current that is to bear it on in the great circuit of the waters. The porous pipe which you lay in the earth becomes at once a channel towards which the surrounding waters tend. The pressure is on every side. That law which propelled the drop through myriads of capillary tubes with an irresistible force, enables it to enter through the minutest passage into this artificial pathway—distilled, perhaps,—but nevertheless driven there, as the fluids circulate through every living thing, animal or vegetable, not by visible tubes alone, but by channels which the microscope can hardly trace or discover. May not the very philosophy of tile-draining, with its strange success, consist in this—that on every square inch of its surface are multitudes of orifices drawing the water away from the adjacent soil, and acting as outlets for the porous earth as the water is distilled away from it? Else how is a tile drain so much more effectual than any other drain ever invented? Crevices and joints do not account for this.

It will be seen by the accompanying plan that I have varied the distances between the lateral drains from thirty to forty feet. In doing this I endeavored to be governed by the condition of the land. The subsoil throughout the field is of the same quality, but the upper and central portion of the field being somewhat lower than the rest, and receiving more flowage of water from the surrounding hill-sides, rendered more frequent drains necessary. So far as I am able to judge the distances adopted by me have, on most of the land, proved sufficient for all practical purposes. In the middle of the field, where the thirty-five feet spaces end and the forty-two feet spaces begin, I thought proper to lay four intermediate drains on each side of the main. These were laid last year. I think I have seen the benefit of them, the collection of water at that point being naturally very great.

It is impossible to fix any rule with regard to the distances of drains. But in land like my own, where the clay is very stiff and the accumulation of surface water very great, I think twenty-five feet in the wettest portions, and thirty-five feet in the driest would be a fair and economical rule to adopt. The rains in this country are often very copious, and the work of relieving the soil of water is very great. Our drains should

undoubtedly be more frequent than in a climate whose rains are more after the order of a drizzle.

Next in order after the distance to be adopted between the drains comes the question of depth. Tiles must of course be laid below the reach of the subsoil plough and the frost. This is indispensable. Beyond this opinions differ very materially. The theory seems to be well established that deep drains draw farther than shallow ones, which probably means that four or five feet will draw better than three feet, on the principle that the pressure of water is increased in proportion to the depth of the drain. And it is moreover urged that deep drains discharge more water, and more quickly and thoroughly drain the land in winter and spring. This is undoubtedly true to a very great degree. On my own land, where the depth varies from two feet nine inches, (a depth which I was obliged to adopt at the head of the first few laterals in the field, in order to give them fall into the main at that point,) to five and a half feet and less, I have found that they worked best at a depth of about three and a half feet. This seems to be well adapted to the stiff clay which I drained. I fixed the head of the main at three feet in order to prevent the necessity of digging too deep at the outlet; and at the point in the field where this drain reached a depth of about three and a half feet my drainage has been most successful. Near the outlet I was obliged to sink my main drain between five and a half and six feet, and of course the laterals are at the same depth—perhaps five feet at the head, and five and a half at the junction. On this spot the drains have not worked so well. I can perceive a very considerable improvement in the land from year to year; but on a small space, about three rods square, where the drains are at this depth, the land has not improved to the extent found in all the rest of the field.

I have ventured to extend my statement to the committee to what may, perhaps, appear to be an unnecessary length, not for the purpose of throwing any new light upon thorough drainage, nor for the purpose of preparing an essay upon the subject, but in order to show the importance which I attach to the work. Not all lands require it, neither will every part of a New England farm pay for it. It has been truly remarked that thorough drainage "does not belong to pioneer

farming." But there is scarcely a farm in Essex County on which it may not be profitably employed to a greater or less extent. Those spots, frequently seen, which produce nothing but "run-hay" while corn is growing luxuriantly on the adjoining slope, may perhaps be very conveniently located for better cultivation. Two or three tons of good English hay to the acre would soon pay for draining. How often do we see the grass crop of a farm almost entirely gathered from the cold, wet fields, because the grain and root crops must occupy the warmer elevations. Would not the cattle of that farm rejoice in the fruits of a little drainage, and their improved condition, together with the increased hay crop, soon return the money spent in tiles and ditches? There may be a little spot near the barns where in a leisure hour the farmer could cultivate a few additional roots for winter forage, but the chilling waters will not yield their sway, and he abandons it to water grasses and weeds. A few tiles might give him a light and loamy bed in which his crops would rejoice.

Thorough drainage does not belong to pioneer farming it is true. It is no part of the work of clearing the forest and expelling the wild beasts. Neither does it belong to fancy farming alone. Every man in such a region as Essex County who can afford to keep his farm through care, and industry, and thrift, can just as well afford to drain portions of it as he can afford to fence and manure it. If he can afford to do the one, he can afford to do the other. If he applies his industry to the one, he can better apply it to the other. For he may build the most substantial fences around fields loaded with manure, and yet find himself inclosing nothing but "vexation of spirit" and a reproach to all his labor, because he has failed to lay the foundation of his agriculture on a well drained soil. Every mechanic who owns his cottage and a few adjoining acres—(and I am happy to say that our county has hundreds of such men)—will do well to commence at the bottom of his soil if he hopes to reap the reward of the farming which he snatches from his bench and workshop.

I have dwelt the more, too, upon tile drainage, because strange as it may appear, stone drains have still their advocates among us. He who improved the plough is looked upon as a benefactor. The inventors of mowing machines, and

horse-rakes, and horse-hoes, and well-balanced shovels, and seed-sowers, and rock-lifters, and stump-pullers are all praised for the benefits they have bestowed upon mankind, and no man thinks of returning to the primitive implements which have long lain neglected by the side of these improvements. But these men dealt with the surface of the whole matter; while he who taught us that by "frequent drainage" with tiles our land might be warmed and freed from stagnant water, and enabled to resist drought and defy flood, prepared the way for a system of agriculture which has already enriched England and Scotland, and may also enrich our own county—a system which furnishes opportunity for the best implements of husbandry and gives them their true value. Tile draining was a long step in advance, from which there should be no step backward. And when we return to the plough of the Puritans, and to sun-burnt manure heaps, then may we return also to stone drains, and watch the water grasses growing over the very spot where the stones were buried.

Salem, November 14, 1859.

Statement of William R. Putnam.

My experiments in draining have been so recent, that I feel that I have but little information to give that will be of practical use.

The field to which your attention was called contains a little more than four acres. It is situated near the bottom of a large hill, which rises about two hundred feet above the field. The soil is a rocky loam, resting upon a hard gravel subsoil; the loam varies from one to three feet in depth; the slope of the field is to the north-east. It has been so cold and wet in the spring, that it could not be planted until late in the season. The practical question with me was, how to dispose of the surplus water. Some advised me to plough the land into ridges and open surface drains. From my experience in an adjoining lot with surface drains, I found they washed so deep, that I had to fill them up. From my first experiment with covered drains, I thought they drained the pocket more than the land. This was a

covered drain laid in 1842. For a few years it did well, but for the last ten years it has been worthless. I think this was caused by laying it too level, and not keeping the outlet clear.

Ten years ago I laid a few rods of covered drain in the field which you saw, which has continued to do well, and the benefit to that part of the field has been such as to induce me to lay more.

In December, 1857, I laid 17 rods of stone drain, about four feet deep, laying stones at the bottom and flat stones for covering, then put on pine boughs to prevent the dirt from filling the water passage. This was done at a leisure time, and in connection with other work, so that I cannot state definitely how much labor was bestowed upon it. The stones were upon the field, and had to be carted off, if not used in this way.

In May, 1858, I laid about 25 rods of drains, using cedar poles at the bottom, and covering them with a slab, leaving an open space of about three inches for the water passage: then put in about eighteen inches of small stones. This has continued to work well thus far. This was opened by ploughing and scraping out two feet of the surface with the ox shovel, and the bottom with a hand shovel. This saves much hand labor, and when the team is not in use, I think it much cheaper than to shovel it all out by hand.

Last spring I laid about 27 rods of tile drain, using three-inch tile, which cost $18 per thousand, the expense of teaming and waste by breaking, making it cost about 25 cents per rod; the digging costs 25 cents per rod, and laying and filling, 8 cents—making 58 cents per rod, at three feet deep.

You ask how the water gets into the pipe. Theoretically, it will come in through the pores of the tile; but practically, I think much of it gets in at the joints. When I laid my drain, I had not seen Mr. French's book upon drainage, and I was troubled to keep the bottom of the drain level enough to have the tile fit close. I found I could lay them best by using a small strip of board to lay them on, and small sods to cover the joints.

You ask at what distance apart the drains should be laid. With me it has been an object to see how far apart I could

have them and carry off the surplus water. I think that three rods each way is as far as we can expect them to operate, or about 40 rods per acre.

Danvers, September 21, 1859.

ORCHARDS.

WORCESTER NORTH.

From the Report of the Committee.

The only entry for premiums offered for the best peach orchard, was made by Addison Hubbard, of Fitchburg. The orchard is now ten years old, and has been pruned every year after the method given by Downing. The orchard standing upon a light soil, the annual growth is only moderate. These two conditions have doubtless contributed to the prolongation of the life of the trees beyond the ordinary time during which the peach, in this locality, is maintained in bearing condition. The trees have still a comparatively healthy look, and with a considerable degree of care may be made to do some service yet.

Our experience teaches us that a more severe pruning is requisite to the continuance of a peach tree through a long life in a healthy condition; and our practice is, every two, three or four years, according to the luxuriance of the tree, in addition to the usual heading in of the young shoots, to cut back the larger limbs, so as to force a growth of young wood from near the centre of the tree, and thus prevent that long extension of limbs, destitute of young wood, which is so common. By this means a peach tree may be kept in a healthy and fruitful state for many years. There are instances on record, of trees that have lived for a century and borne regular crops. This, however, can only be attained by constant care and attention to the wants of the tree. Excessive growth must be repressed, and the tree be made to branch low, from one to two feet from the ground, and then such a course of pruning

followed up as will keep the whole compact, and always full of young, bearing wood.

The subject of the reclamation of old orchards is one of considerable importance, inasmuch as there are great numbers of old trees all over New England, which are bearing apples fit only for the manufacture of cider. A large portion of these trees may be made to pay handsomely for the cost of grafting and the requisite care necessary to bring them into a fruitful condition. If the trunk of a tree is sound, and shows some degree of vigor, it will unquestionably remunerate the owner for the time and labor required to renovate it by grafting and cultivation. A good deal of care, however, is required in order to prevent the tree from dying in consequence of an excess of well-meant, but often misjudged and misapplied kindness. Many a healthy, vigorous tree, more especially of the pear, has been sacrificed to the want of knowledge on the part of the experimenter.

A judicious plan of proceeding we conceive to be as follows, and in order to more fully comprehend the matter, we will consider but one operation at a time. First, then, we will take up the subject of grafting. It is generally considered best to graft but about a third of an old tree in any one year, beginning with the topmost branches. This is a very good rule, but liable to some exceptions. If the tree is unthrifty, and has made but a trifling amount of wood during the previous season, we would graft half of it at once, and even in some cases we have grafted the whole tree at a time. The object in view should be to cut away so much of the tree as may be necessary to produce a thrifty growth of the scions. If too little is removed, the growth will be weak and the union imperfect. If too much is cut away, we may get too large a growth, which with certain varieties of the pear, is a result very much more to be feared than the opposite. In the second spring, another third or half, as the case may be, is grafted, and the whole operation completed in the third year.

The effect of thus removing in two or three years all the foliage bearing parts of an old, established tree, is that of an energetic stimulant. All the powers of the tree are roused to repair the loss sustained, and in the operation it may be said to renew its youth. It puts forth its energies in making wood

freely and rapidly, and assumes almost at once the appearance of a healthy and vigorous tree.

We come next to the treatment of what are called "suckers," which, in the common mode of cleft grafting in the small limbs, make their appearance freely and sometimes in great profusion along the sides of the grafted limb. One plan is, in theory, to remove every one as soon as it shows a leaf: in practice to cut them all out two or three or more times during the season. Another mode is to carefully preserve every leaf until the close of the growing season, and then, at the time of winter pruning, to cut them all out clean at once. The objection to the first mode is this. The small amount of foliage which the scion possesses in the early part of the season is often insufficient, especially in limbs of some size, to induce that circulation of the sap necessary to maintain and promote growth, and the scion, after making perhaps a good start, languishes and shows only feeble vitality, and makes but an indifferent union with the stock. The objection to the other plan is, that suckers frequently outstrip in vigor the scions themselves, and although under such circumstances the scions may make a good union, yet this growth is less than it would be under different management.

The best method that we have found, and one which we invariably adopt after grafting the pear, is this: to let every sucker grow for a length of time depending upon the size of limb, and the vigor of the scion. As soon as the scion has made a good start, or if it hesitates while the suckers start strong, the ends of the latter are to be pinched out so as to stop their elongation, and throw more vigor into the former. Once pinching is ordinarily enough, but sometimes it is advisable to attend to it again, or even more than once, if the scion does not make wood satisfactorily. At the winter pruning, all the suckers are to be cut out clean. If it is desirable to get all the growth possible, as in the case of some slow-growing varieties, or rare roots that we wish to force, the suckers may be cut out as soon as the graft shows an amount of foliage sufficient to continue a vigorous growth, independent of their assistance. In grafting old apple trees on the large scale, we should not follow this rule quite as strictly as in the pear, but would content ourselves with going around once in the middle of the season, and pinching out the ends of vigorous suckers, perhaps cutting out some

of them entirely. During the second season, and afterward, if the scion has made good growth, the suckers may be rubbed out as they appear, or where this is not the case, the suckers may be allowed to grow to some extent, the ends to be pinched out if they detract from the vigor of the scion. Every thing is to be cleanly cut out at the winter pruning.

There is another view in which to look at the matter. If the suckers are cut out at the winter pruning, it acts as a stimulant to the tree; whereas, if they are removed as they appear, or at any time during the growing season, the operation acts as a check to its vigor, and in rejuvenating old trees, we need the former rather than the latter influence, in most cases.

The next matter to be considered is the influence of scraping and washing the trunk and larger limbs of old trees at the time of grafting, or subsequently. We have never felt over-confident in regard to the value of scraping, of itself, except as a preparation for the application of some wash. If the operation is so performed as to remove simply the mossy and dead portions of the bark, it can of course do no harm, but if it is more carelessly done, so as to mutilate the living bark, it is an absolute injury. The washing of trees may be made useful or otherwise, according to the material employed. If dissolved, caustic potash is used, of a strength greater than a pound to a pailful of water, there is much danger of producing an unhealthy condition of the bark, particularly in young trees, and also in too closely scraped old ones. The bark, under such circumstances, is apt to take on a reddish hue, and is often scalded, as it is called, upon the sunny side. A much better preparation, and one with which we feel well satisfied, is made by mixing together equal parts of soft soap and fresh cow-dung, to which is added sufficient water to render it easily applicable with a brush. The bark, under the application of this mixture, assumes a dark green color on young trees, and has a healthy appearance; and a wash of this nature has been found to favor an increase in the size of the trunk or limb to which it is applied. The effect of scraping and washing, so far as they extend, is of the same character as grafting, winter pruning, &c., as it acts as a stimulant to the energies of the tree.

The application of manures or special fertilizers, with or without ploughing or cultivation, to old trees at the time of

grafting or afterwards, acts also as a stimulant, and in the use of them we should be guided by the condition of the tree. If it be a very unthrifty one, we of course may make applications of this sort much more liberally than if it were in a vigorous and healthy state. We have often noticed one great misconception which people appear to entertain, as shown by the fact that they apply the manure within a circle of perhaps a rod or a rod and a half in diameter; whereas, with our ideas of the condition of an old tree, and the way in which it is supplied with nourishment, we should incline to apply nearly the whole of it *outside* of such a circle. As a general rule we do not think it advisable to apply manure until after the tree has been grafted two or more years, and in fact at all, as long as its growth is satisfactory without.

From the foregoing considerations it will be seen that nearly every operation which is performed in reclaiming old trees is of a highly stimulating character, and when they are all brought to bear at once upon a tree which may, perhaps, have been entirely neglected and allowed to grow in sward land for many years, the result will too often be of a fatal character. The balance of the tree is destroyed; the new wood which grows late is not properly ripened and matured to stand the winter. After the scions for one or two years have made an enormous growth, and borne, very likely, a fine crop, there will be found dead or dying limbs, and often, with the pear especially, the tree lingers out a precarious existence for a year or two longer, and finally dies in consequence of over stimulation.

It is therefore very important that we should not be in too great haste to obtain results. Moderate growth, with health and hardiness, is better than great luxuriance, with succulent, tender and delicate wood. By taking an extra year or two to bring about the conversion of an old tree into a young one, we may preserve its life with many years of productiveness.

Before taking leave of the subject, we desire to call attention to a kind of grafting which, although not common yet, has many things to recommend it. We have employed it to some extent, and feel pleased with the result thus far. The plan is this:— A limb which carries from a fourth to a half of the foliage of the tree, and which may be of any size, even to twelve

or more inches in diameter, is sawn carefully off at a foot or two from the trunk. With a grafting knife, the blade of which for this purpose should be from six to eight inches long, a number of splits are made around the edge at right angles to a line of diameter, as if to take off so many chips. From the end of one cut to the end of the next one adjoining, the distance should be from one and a half to two inches, and the chips should have thickness enough to hold two scions firmly. A scion prepared in the ordinary way is then inserted in each end of every split, making in all from four to sixteen, according to the size of the stock. All the openings, and that part of the stock outside of them, should be well covered with grafting wax, and the central portion with the shellac solution. Nothing more is done until the next spring, when a portion of the scions are cut out, as they tend to crowd each other. At the second spring pruning, one, two, or three, as may be thought best, are allowed to remain, and all the rest removed. A second portion of the tree may be grafted a year after the first, but we think it better to have two years' interval, if more than one-third is grafted at a time.

The advantages of this mode of grafting are stated to be these: The work is quicker accomplished, and requires a less number of scions. When the tree comes into bearing, it is much more compact than where the scions are set at a distance from the centre. This will be found an important item in gathering the fruit. Suckers give next to no trouble, as when the grafting is completed, there is nothing left of the old tree above ground but the trunk. The amount of firewood obtained is frequently sufficient to pay all the expense. The only drawback which we have heard suggested was, that the healing of the stump is not satisfactory; but we think that a careful attention to keeping the openings covered with wax, and the end of the stump with shellac for a year or two, will obviate any difficulty on that score.

Jabez Fisher, *Chairman.*

Statement of Ephraim Graham.

The reclaimed orchard that I offer for premium consists of about sixty trees. When I first moved to my place in 1839, there were not five barrels of good, merchantable apples gathered from the premises, but almost any quantity of cider and other apples might be found. In 1840 I commenced ingrafting, and continued so to do, to a greater or less extent, for ten or twelve years. Some of my trees were young and thrifty, others more advanced, and many of them on the decline of life; so much so, that I was advised not to undertake to reclaim them—that they were better adapted for firewood than to grow fruit. In 1846 I gathered my first crop of apples, mainly Baldwins, about forty barrels. In 1848 I gathered about sixty barrels, in 1850 seventy-five barrels, and about fifteen barrels of second quality; in 1852 some ninety barrels, and fifteen or twenty of second sort, worth half price. In 1854 were gathered from these trees one hundred and twenty-five barrels of first-rate apples, besides some twenty or twenty-five barrels of second quality and cider apples. In 1856, being a sparse year for Baldwins, although the even year, I had only sixty barrels, and those of meagre quality; in 1858 I gathered from my orchard one hundred and ten barrels, and the present year about forty, as some of my Baldwins of the "odd year" have now commenced bearing. When my trees were transplanted, they were "set out" without order or regularity, but "sprinkled" over all parts of the farm; I have been careful to prune my trees every year, or nearly so, and in some instances I am satisfied that the saw and pruning knife have been too freely used; I have not been particular in regard to the season for pruning, but adopted the old adage, "trim when the saw is sharp," whether January, March, June or November. I have not neglected to use the scraper upon the trunks of my trees in the spring of the year, after heavy rains, when the old outside bark would easily yield; and perhaps in some cases this implement has been used to excess. I have frequently washed my trees with a solution of clay and cow manure; whether or not this process had been beneficial, I am not able to determine. One of my trees, in particular, I was advised not to renovate on account of size and age, but

subsequently was advised so to do by an "old, experienced orchardist," Samuel Downing, Esq., of Lexington, to whom I am indebted for many valuable hints and suggestions in relation to renovating an old orchard, as well as in the cultivation of a young one; this suggestion being made on the premises, that the tree would yet produce $100 worth of fruit in its day and generation. I have kept a separate account of the proceeds from this tree since the first year of its bearing; in 1846 it produced four barrels, worth $8; in 1848, four barrels, worth $8; in 1850, five and a half barrels, and one of second quality, worth $10.50; in 1852, six barrels, and two barrels of second quality, worth $10.50; in 1854, seven and a half barrels, and two of second quality, worth $11; in 1856, being the "hard year" for Baldwins, only three barrels, worth $10.50; in 1858, five barrels, worth $11.

When I first commenced the work of improving my orchard I removed the earth from the trunks of the trees and incorporated compost manure; but, reasoning from analogy, I came to the conclusion that this process added about as much to the growth and nourishment of the tree and fruit, as it would to put a hungry boy's dinner into his boots; I therefore abandoned this process. As all feeders of the tree lie at no small distance from the trunk, it is well to plough and cultivate orchards quite frequently, and prevent, at least at intervals, grass and tree roots growing at the same time on the same land.

My process of ingrafting for the last few years on old trees has been to insert one-third of the tree each year, commencing at the top and working downwards, until the whole of the tree was completed; thus requiring three years to complete the work. This method is better than any other I have tried for ingrafting old trees, as it gives the young grafts an opportunity of getting well started; cutting off and ingrafting the top first gives the grafts there the best chance, while the necessary pruning of the top throws the sap into the remaining side branches and prepares them for ingrafting the second year; the third year, the lower branches will have been made ready in the same way. As far as I have had observation and experience, I am satisfied, especially in ingrafting old trees, that the practice of cutting off all or nearly all the limbs the first

year, is far from being judicious; by this method there is not sufficient strength in the top to draw the sap from the roots for the growth and nourishment of the young grafts. Hence the first year, by this process, the grafts barely live; the second year they make only slow progress, and by this time the whole tree begins to decline, and in a few years is nearly useless. In 1851 I had five or six trees fast going to decay; so much so that it was doubtful in my mind, as well as in the mind of others, whether they were worth ingrafting. I however commenced the work in May, 1851, in '52 and '53. I cut away the old limbs sparingly, except those that were dead or nearly so; very little was done by way of cutting off either old limbs, or thinning out grafts, till 1858 and '59, when in June, '59, the trees were wholly bereft of their old limbs, and as many of the new ones as necessary; the tops are now in a healthy condition. These trees have grown two very good growths of fruit of good quality, one in 1856, the other in 1858, and give promise of future usefulness.

Statement of W. G. Wyman.

Reclaimed Apple Orchard.—The reclaimed apple orchard which I offer for a premium, consists of one hundred and seventy-five trees of various ages, from twenty to eighty years, or more, all of nature's own planting, scattered over my fields, and pastures, mostly the latter.

A very few of the trees in the field were grafted when they came into my possession in the spring of 1853, but most of them, and all in the pastures produced only almost worthless varieties of fruit. The trees had no appearance of having ever been trimmed or pruned except by the cattle; were very crooked and scrubby, and densely filled with sprouts, thorns and dead limbs.

I commenced grafting a few trees in the fields in 1853 and 1854, and in 1855 took hold of the main orchard in earnest, selecting the best trees out of over three hundred, the others furnished good fire wood, and grafting about one-third of the tree, usually at a time, commencing with the top, and so continued for three successive years. The suckers have been care-

fully pruned out every year, after the season's growth of wood was made.

With the exception of a few trees in the fields which have been well cultivated, manured and scraped, I have not cultivated or manured the orchard thus far; have only grafted and pruned. I propose to put one or two loads of swamp-muck to each tree next winter, and the ensuing season one or two bushels of ashes; cultivation is impracticable.

The varieties grafted are one hundred and twenty-six Baldwins, thirty Hubbardston Nonesuch, five Roxbury Russet, and fourteen of various other varieties. The expense incurred for reclaiming the main orchard has amounted to about one dollar per tree, and the income nothing to speak of until this year, when I obtained nine barrels of apples, which sold for twenty-seven dollars.

Reclaimed Pear Orchard.—The reclaimed pear orchard which I offer for a premium consists of forty trees, thirty of which are, from the best information I can obtain in relation to their history, from eighty-five to ninety years old; the remaining ten are of various ages, from twenty years upward. Most of them have never been cultivated. They produced naturally a small native pear, intended originally for perry.

In the spring of 1853, when they came into my possession, I commenced grafting them, cutting off about one-third of the top of each tree. Twenty-three were grafted that season. The next year, 1854, I grafted about one-third of the remaining limbs upon these trees, and commenced on about half of the remaining trees. In 1855 I continued the process of grafting, as in 1854, and commenced on the last and poorest of the trees; in 1856 I finished grafting those first commenced, and continued with the others in nearly the same manner.

Most of the old trees I have manured with about one-third of a cord of swamp-muck, and two bushels of ashes each, spread around the trunk of the trees in a circle of about sixteen feet diameter, and have mulched most of these with leaves and brush. Where the soil admitted of it, I have recently ploughed around the trees, and am now cultivating nearly one-half of them, including several of the younger trees, which have been well cultivated and manured four or five years.

The varieties grafted are the following: eighteen Bartlett, ten Lawrence, two Urbaniste, two Beurré Superfin, two Beurré d'Anjou, one Flemish Beauty, one Beurré Bose, one Beurré d'Aremburg, one Winter Nelis, one Doyenné Sieulle, and one Madeline. The Bartletts commenced bearing the second year after being grafted, and have borne more or less every year since, although the present year the crop was very light, several of the trees having been badly injured by the weather last winter. The other varieties have nearly all commenced bearing.

I am unable to state definitely the expense of reclaiming, or the value of the fruit obtained from the trees, but am convinced that the pears already obtained have been worth double the expense incurred. In 1857, after reserving an abundant supply for my family, I sold pears from these trees to the amount of twenty-six dollars and seventy-nine cents.

PLYMOUTH.

Statement of Austin J. Roberts.

Pear Orchards.—Some three years ago I entered my name as a competitor for the society's premium on pear trees, which is to be awarded this year, and I herewith submit my statement in regard to the method of cultivation and management of my pear gardens.

The pear, like every thing highly desirable and valuable, cannot be had without much attention, labor and skill. The relative prices of the apple and pear being as one to ten, show at the same time the superior value of the latter, and the superior skill required to bring it to perfection. On several accounts, the pear possesses superior merits over other fruits. The first is, its delicious quality as found in the finest varieties, its buttery or melting texture, and its delicious and perfumed flavor. In this respect the pear greatly excels the apple, and the winter varieties keep nearly as well. The first question that occurs to every one commencing any branch of cultivation, is in relation to the probability of success, ultimate profit, or, to use a plain, homely, Yankee phrase, whether it will pay. Now, before going into any details of *how* pear trees should be cultivated, I will mention a few examples of successful pear

cultivation, which I know to be accurate and reliable; showing that with scientific care and culture, certain varieties of pears *can* be raised with much profit.

J. Stickney, of Boston, obtained for his crop (which was a large one) of Louise Bonne de Jersey, in 1856, ten dollars per bushel. John Gordon, of Brighton, Mass., sold Bartlett pears for several of the past seasons at ten dollars per bushel, while the same variety, under mere common culture, and at the same time, was selling at only three dollars per bushel. Ellwanger and Barry, prominent nurserymen at Rochester, N. Y., who cultivate the Glout Morceau largely, obtained three dollars per dozen last winter, and T. G. Yeomans, of Walworth, N. Y., who cultivate almost exclusively the Duchesse d'Angoulême variety, sold, in 1857, his entire crop, from several hundred trees, at fourteen dollars and fifty cents per barrel. Many other instances might be mentioned where pear culture has been made successful under proper attention, but I will conclude by relating my own personal success.

I have in all about four hundred and ten pear trees of different ages, the majority of which are four years old; the proportion of dwarfs to standards is about two-thirds, and my collection embraces some fifty varieties, being of the best summer, autumn, and winter kinds. My selection, which is somewhat large, I would willingly compress into a dozen of the old standard varieties, adding perhaps three of the newer kinds. The spirit of adding to our collections beyond a certain number of well-known, well-tested kinds, is much to be deprecated among our pear cultivators.

After some years of practical experimental knowledge in pear culture, I am forced to admit that there are comparatively few of the now almost endless varieties which can be safely recommended *as entirely satisfactory sorts;* and in this statement I will append the names of those varieties which may be fully relied upon as worthy of extended culture, tried, and not found wanting:—

Vicar of Winkfield, Louise Bonne de Jersey, and Angoulême (on quince,) and Bartlett, Flemish Beauty, Seckel, Lawrence, Buffum, Beurré d'Anjou, Beurré Superfin, and Sheldon, on the pear stock, the last three newer kinds. If I were to select two kinds from these eleven varieties, I should name the Bartlett

on pear roots, and the Vicar of Winkfield on quince; the latter sort I have found extremely productive and profitable. Of this variety I have two hundred bearing trees, and have found no difficulty in selling the fruit annually at four dollars per bushel.

The thorough cultivation of the ground about pear trees should not be overlooked; no half-way treatment will do; nothing less than a soil and subsoil enriching treatment will suffice. Of all fruit trees, the pear requires the richest soil and the most careful treatment. I have found that one of the best manures for pear trees is a compost formed of well decomposed swamp-mud or muck, mixed with one-half its bulk of stable manure, (horse manure,) and one-twentieth of leached ashes; the compost to lay six weeks before using, being in the mean while twice well shovelled over. Bone-dust, guano and ashes are all valuable as fertilizers in pear culture; two quarts of ashes, with the same of finely ground bone dust, and one of guano mixed together and applied annually in the fall about pear trees, digging it in four to six inches, will be found greatly to increase the growth and fruitfulness of the tree. This for trees of four years old. For smaller or larger ones, measure the quantity accordingly.

Statement of R. A. Littlefield.

The pear trees entered by me for the society's premium, payable in September, 1859, are set on a fine, sandy loam, with somewhat of a clayey subsoil. The land has been manured and planted every year since the trees were put upon it. A large portion of those worked on pear stocks were raised in Flushing, L. I., the remainder were raised by myself.

My method of transplanting trees is to dig a hole, say four feet in diameter, and two or three feet deep, then fill it up with soil so that the tree shall stand its natural depth in the ground, the ends of the broken roots having been cut smooth with a sharp knife. I then spread manure about the top of the ground; none should be put *under* the tree unless it is very rotten; it endangers the tree, as it is almost certain to suffer from want of nourishment.

Of the thirty-seven different varieties composing the two hundred and twenty trees shown the committee, I regard the six following as the most profitable that I have yet fruited, viz.:

the Bartlett, Belle Lucrative or Fondante d'Automne, Dearborn's Seedling, Buffum, Flemish Beauty, and the Vicar of Winkfield, which last, though it is only a second or third-rate desert fruit, yet it is a first-rate baking or cooking pear, and as the tree is remarkably vigorous, and bears abundant crops of large, fair fruit, I think it a profitable variety for orchard culture. The Seckel, though generally considered the finest variety known, on my young trees cracks so badly as to render it of little value; the Beurré Diel, from the same cause, is worthless; none has done better with me, or produces finer crops of fruit than the Bartlett.

As regards dwarfs, I think the pear cannot be worked on quince in this locality, so profitably as on its own stock; although it comes into bearing younger, yet the tree, from various causes, is more uncertain, and shorter lived.

The varieties that have done best on the quince are the Glout Morceau, Vicar of Winkfield, and the Louise Bonne deJersey.

The pear does best under high cultivation, and when thus cared for, no tree produces more delicious fruit, or is more profitable; and no man possessing a single rod of ground should omit setting upon it, at least *one* pear tree, and that one should be a Bartlett.

PLOUGHING.

ESSEX.

From the Report of the Committee.

Ploughing with Double Teams.—However important good ploughs may be, other things are of nearly as much importance to make good work.

A strong, well disciplined team is necessary. I say strong, because a team that can proceed without an extra effort is more certain to make a straight furrow and good work than a team of a different character. A good teamster is also necessary; for a team cannot be well disciplined without a good teamster; and even after it is disciplined, perfect work cannot be performed without a good teamster.

A good ploughman is also necessary to make good work. He should not only understand how to hold the plough: he should also understand how to arrange it, to give the right width and depth to the furrow, as the width and depth should be of suitable proportion to make good work. A deep, narrow furrow will not turn well, neither will a shallow wide furrow turn well.

As to the best mode of ploughing, to lay the furrow flat or otherwise, depends on circumstances. If it is for immediate cultivation, and the sward is tough and hard, the manure may be more easily worked in, and it will be easier hoeing if turned flat, but the crop may not be any better. If it is designed for cross-ploughing before being cultivated or planted, the sward will rot quicker by ploughing rather shallow and not turning the furrow perfectly smooth, but letting one furrow lay on the edge of the other.

Deep tillage is generally understood to be desirable. This again depends on circumstances. Turning up a large amount of subsoil and using but little manure sometimes proves unfavorable for the present crops; but with plenty of manure there is no danger of cultivating too deep, unless the subsoil is very unfavorable.

It has been said that every ploughman should understand how to arrange the plough. This, however, cannot always be expected, as farmers are under the necessity of hiring men that are but little acquainted with ploughing. Therefore it is necessary that every farmer should personally not only understand how to arrange and hold his plough, but all the other departments of farming.

A man within the knowledge of some of your committee, who owned a large farm, well stocked with cattle, horses, and implements of husbandry, went to a store to purchase a plough, saying that he had a plough that was formerly a good one—that it was not worn out, but did not work well, but the cause of so great a change when there was apparently no defect in the plough, he could not understand. The trader, fully understanding how to arrange and hold a plough, if not to make one, very kindly took a plough to the farmer, and used it in his field to his satisfaction. The new plough being purchased, the old one was examined to ascertain, if possible, the cause of the difficulty. The observing eye of the trader at once saw the

defect, saying to the farmer if you will come to my store and purchase a new point, your plough will be as good as ever.

From the above we may learn the following lesson—that every farmer should be well informed as to his own business, and not be under the necessity of calling on his neighbors or traders for advice; for should he do so, they will most assuredly sell him the new plough before they recommend a point to the old one.

JOSEPH HOW, *Chairman.*

From the Report of the Committee.

PLOUGHING WITH SINGLE TEAMS.—It seems hardly within the bounds of propriety that the exhibition of ploughing at our County Show, so underlying all other great industrial operations, should be allowed to pass off, as is sometimes the case, with the mere announcement of the award of premiums. The committee, indeed, all of whom were present except one, whose place was filled by Mr. Tenney, having given the closest attention to the duties assigned them and having pronounced their decision unanimously made, separated; so that they as a committee cannot be held responsible for the remarks that follow.

The lots for ploughing were laid out as usual, 210 feet long and 34½ feet wide, containing one-sixth of an acre each. The time of commencing was 10 o'clock 13 minutes. Mr. Winslow finished at 12 minutes before 11 o'clock, and Mr. Barker one minute later. Mr. Winslow's team being 35 minutes, Mr. Barker's 36 minutes. Both ploughs turned the furrows so as to leave no vegetation in sight. The land was left by Mr. Barker's plough (Robinson's) in a condition somewhat more friable than by Mr. Winslow's, (Parker & Co's). This appeared to be the effect of leaning the plough to the right. It would undoubtedly be a recommendation to a plough to leave the surface mellow, provided it could be done without detracting from the quality of the work in other respects. Mr. Winslow's (Parker & Co.'s) plough left the bottom of the furrow level, and the land side perpendicular. Mr. Barker's plough by being held out of perpendicular, leaning to the furrow, left the bottom uneven and the land side cut under, thus leaving an unfinished appearance. Mr. Barker uses the Robinson Plough, No. 11, and was his own ploughman.

The plough entered by Mr. Alley was fresh from the Agricultural warehouse of Parker, Gannett & Osgood, of Boston, marked "Lion, No. 61." It was operated by Mr. Winslow, and for the sake of convenience his name is here used instead of Mr. Alley's, the owner.

Mr. Winslow held his plough upright, and accordingly left the bottom of the furrow flat and the land side of the furrow perpendicular. Mr. W. is an accomplished ploughman, the uniform width of his furrows and consequent uniform width of his land, were preserved admirably from beginning to end. Mr. Winslow's furrows were cut about two-thirds of an inch narrower than Mr. Barker's, the effect probably of holding the plough upright. It was interesting to notice his calculation for the last furrow. For some reason not explained to the committee, Mr. Winslow arranged to leave off at the end opposite to that where he began, and in effecting this it became necessary to go once over the ground without any furrow. The width of the final furrow was as uniform throughout as though gaged by a carpenter, and the turning of this furrow was performed to admiration.

Mr. Barker's plough would have ranked very high a few years ago, but since the "Lion" of the Boston house, already mentioned, has taken the field, it is useless for any but the very best to attempt to compete. That Mr. Barker's plough cut its furrows nearly an inch wider than Mr. Winslow's appeared to be the effect of leaning it to the right.

Although Mr Winslow finished his work one minute before Mr. Baker, yet it was not on that account that the first premium was awarded to him. This is stated for the purpose of assuring competitors, that speed alone is not the true criterion. Farmers must watch the improvements constantly being made in the plough as well as other implements for the farm, and avail themselves of such improvements. We are seeing the day when more intellect is expended in a single year upon improvements in the plough, than was formerly put in requisition in a century. And notwithstanding the great perfection to which this implement is carried, the constant advance that is being made almost warrants us saying that the field of competition is as open as ever it was. Some seven years ago, a member of our committee paid thirteen dollars for a celebrated

plough from a celebrated house, but it never run well, and has not been used at all for four years.

The points upon which improvements in the plough depend, are often minute and nameless. Mathematics fail to bring out the perfection which some distinguished men have expected. "A gentle hollow curve" for a mould-board is too indefinite, certainly. The whole subject is intricate. Of this any one may be easily satisfied by attending a trial in court for an alleged infringement of a patent. The late distinguished Judge Story talked cleverly on the subject of ploughs, that is to say, if the comprehension of jurors might be consulted. "The introduction of a new principle, or a new combination of old ones" is said to be sufficient to defeat a charge of infringement. But in such a tool as the plough, who could so point out the shades of difference as to be intelligible to a jury, even with all the models and *bona fide* ploughs which blocked up the court-room and the passages leading to it, in a trial a few years ago before the lamented Judge just referred to? Between the improved plough of John Small, and the wedges called such, in and before his day, a difference could be seen, of course; between Small's and Mr. Jefferson's the difference was less perceptible and more indefinable; and between Jefferson's and those brought out at the shows twenty-five years ago, a practiced eye would detect the shades of difference easily, no doubt. But who would undertake in words alone to show the variations between two such ploughs as are frequently brought upon the field on the day of the annual show, however different the work might be which they should perform?

I have said that mathematics, when applied to this subject, seemed to fail of bringing out a perfect plough. Ferguson's celebrated Scotch plough was made upon mathematical principles as calculated by Mr. Jefferson. But when this plough was put upon trial by Mr. Pusey, President of the Royal Agricultural Society of Great Britain, and subjected to the most complete set of experiments then ever instituted, as reported in the third number of that society's journal, "instead of requiring the least power of draft, it required the most," owing to "its long, wedgelike form, the great surface of its mould-board," and its wanting a wheel, which made its surface-draft so enormous."

American ingenuity might seem to be entitled to repose for a while, until other nations come up. Foreign countries are behind us in the matter of the plough as well as the reaper. Englishmen affect to scout Mr. Webster's remark on his return from Europe, viz.: that he had seen nothing abroad which would compare with American ploughs; but he was right, for by the report of a committee at a most thorough trial at Sing Sing, in October, 1842, it appears that the European ploughs cut their furrow-slice ten inches broad and six deep only, while the American cut twelve inches wide and eight deep. But Yankee ingenuity asks for no repose, indeed we should not desire to have any.

It is hardly necessary to say, perhaps, that it is not possible for the same plough to work well in entirely different soils. It is said, indeed, that the Vermont "Universal Plough," invented by Mr. Holbrook, is an exception. It is said to be fitted by having a variety of mould-boards for any soil. The inventor probably took his hint from a description of one of the old Roman ploughs, which was fitted with extra mould-boards for the same purpose, but which has been suffered to go out of use by the common consent of mankind.

History of the Plough.—Roman history throws light upon the plough as an instrument of agriculture. Cato mentions two kinds, one for strong and one for light soils. Varro mentions a plough with two mould-boards, for the purpose, he observes, of ridging when they plough after sowing the seed. The Romans had ploughs, says Rev. A. Dickson, with mould-boards and without mould-boards, with coulters and without coulters, with wheels and without wheels, with broad pointed shares and with narrow ones, not only with sharp sides and points, but with high raised cutting tops. The simple Roman ploughs, says the London Encyclopedia, by which is probably meant the plough for light soils, had no mould-board or coulter: the "plough staff" was also a detached part, and the manicular which the ploughman took hold of, was a short bar fixed across; and to the draught-pole the oxen were attached. Virgil's plough had a mould-board, says the Encyclopedia, but the common plough for light soils, instead of the mould-board, required either a stick inserted in the share-head, or to be held obliquely. "Cir-

cumvolving furrows," says the Encyclopedia, "as employed by us, were not practiced among the Romans, but the cattle returned in the same furrow;" by this we understand one of two things, viz.: either first that the team did not go round the land, leaving the dead furrow in the middle, but by ploughing all on one side, losing one travel of the team for every furrow, the dead furrow would be brought out on the side of the piece ploughed; or secondly, the plough must have been our side-hill plough, in using which, as now used, the dead furrow would come on one side, without any loss of travel. This is the more probable, although not a word is said about a side-hill plough.

Indeed, in reflecting on this sketch of the Roman ploughs, we are struck with the fact that the ploughs of that day anticipated every kind in use among us; many went beyond any thing we know, unless indeed, the Vermont universal plough already referred to, be an exception. Probably agriculture and agricultural implements all declined with the commonwealth itself and died, or went into a long exile, from which they have never returned to the papal fields. One maxim in Roman agriculture ought not to be overlooked, viz.: "Sow less and plough better,"—a maxim worthy of lasting remembrance and constant practice.

Agriculture, like religion, merely glimmered through the dark ages. Flocks and herds in England were the order of the day, yet upon these the Saxons seized for their own use. "No man might guide a plough who could not make one, and the ropes with which it was drawn were to be made of twisted willows; it was usual for six or eight persons to form themselves into a society for fitting out one of these ploughs." Let a society of this kind be compared with the agricultural societies of Massachusetts in our day!

Nothing could be more interesting than to trace the history of the plough from the time when it required twelve oxen or eight horses to draw the "turnwrest plough," with two able men to hold it, and one or two to bear upon the beam and two drivers, down to our times, when two oxen, with one man to hold, none to drive, and none upon the beam, can plough at the rate of an acre in six, or even five hours. In passing, however, look a moment at the great Hertfordshire wheel plough, "a great favorite" in its day, yet according to Arthur Young,

"heavy, ill-formed and ill-going," the ploughman obliged to walk wholly on the unploughed land, resting nearly all his weight upon the handles, his body making an angle of forty-five degrees with the horizon. Three or four inches of the furrow next to the unploughed land were cut three inches deeper than the rest of it, though the surface was left looking quite well.

And in connection with the mention of this heavy Hertfordshire plough may be contrasted the first great, yet overdone improvement, viz.: the Rotherham plough, weighing only 1¼ cwt. Such facts go to show the entirely unsettled theories of those times. It was for James Small, a Scotch mechanic, to invent the iron mould-board and attach it to his swing plough, giving it such weight and power as to make it a general favorite from 1764 nearly down to our times. The name of this inventor should not be forgotten. His plough would look rude, perhaps, at the Essex County cattle shows, but it delighted the Dalkeith Farming Society, to turn from the old Scotch plough, requiring a force of 16 cwt. to draw it through an "old ley," to Small's plough, doing the same work with "a force of from 9 to 10 cwt." Yet all this while even James Small was no mathematician, and it remained for later times to apply scientific principles to this noble instrument.

It must have been gratifying to an American fifty years ago, to discover the fact that the famous Scotch plough of Ferguson, which obtained so much celebrity from Mr. Loudon's praises bestowed upon it—(he declared that it was superior to any similar plough known in England)—was constructed upon the principles before referred to, laid down by Mr. Jefferson in his celebrated report "on the true shape of the mould-board," addressed by him to the French Institute, in which he showed from mathematical data that it should be in the form of a "gentle, hollow curve," while the ploughs in use were generally "more full and short, not raising the earth gradually like a wave, but throwing it over at once." It is known that Mr. Jefferson left France for America in 1789, so that his plough was invented after Small's, and was an improvement upon it.

I have already said that ploughs constructed upon the principles suggested by Mr. Jefferson were faulty. Was this the effect of his mathematics, or of the method of applying them? Or is it not more probable that a perfect plough would grow out of a

long observation of long continued, carefully made experiments; experiments made under the eye of keen intellects and a keener competition? The mathematical rule in application to the draft of the plough is, that the resistance is in proportion to the square of the furrow depth. Thus, if at the depth of four inches the draft required were 252 pounds, at the depth of seven inches the draft would be 771—(the square of 4 being 16, and of 7 being 49.) But by Mr. Pusey's experiments the result proved otherwise. In a moory soil the same plough, which at the depth of six inches required a draft of 306 pounds, required 700 pounds at the depth of twelve inches.

If my suspicion be true, that it is experiment and not arithmetic, observation rather than algebra, that is to work out the grand problem of a perfect plough, then, as before intimated, the field of competition is still open. And with the present system of annual exhibitions and governmental patronage, the presence of woman, the orator's voice furnishing music for every body to keep step to, aye, and the presence of those whom Thomson calls the kings and awful fathers of mankind, why should not improvements in the plough go on to their utmost possible limit? I am brought in closing to say a word on the subject of ploughing matches.

The Monthly Farmer in the May number for 1841, published by Gov. Hill of New Hampshire, contains the following item from the Maidstone Gazette: An extensive farmer of Essex, (England,) not many years ago happened to lose his ploughman, and went to the overseers of the parish poor for another. Out of over sixty men at work on the roads not one could be found who could hold the plough. The magnitude of the evil induced seven farmers to join him in a society, which offered premiums for the best ploughman. This is said to have been the small beginning from which all agricultural associations have originated.

Beyond all dispute the public exhibition has made ploughing and the plough nearly all they are. Dr. Franklin's remark upon foppery in dress, that "it is other people's eyes that spoil us," has its application here conversely; "it is other people's eyes that make us." No man will venture himself upon the arena to be shot at, or to shoot at others, without long practice. The field presents a ring of competitors, every one of whom under-

stands that with all the civilities, and courtesies, and smiles, and bows of the occasion, there is not one there who will not utterly supplant him if he can. This calls for the long preparation, not only of himself, but his driver, the team, and above all the PLOUGH.

Massachusetts, and especially Essex County, has a lesson to learn from the remarks of Judge Buel, who says that when a state draws its principal subsistence from either manufactures or the sea, owing to bad soil, climate or geographical position, agriculture will not succeed. In Essex County, with the ocean around half our border, and a million manufacturing wheels within our hearing, both offering splendid rewards with little labor, agriculture would stand small chance without a smiling patronage. In Spain, Portugal, and the Papal States, that patronage was withheld, and public opinion degraded it, and it died. In Russia, Prussia, Poland and Hungary the laws villainized it, and there too it died and was buried. The implements of husbandry in those countries are monumental of these facts. "The ploughs in the north of Europe act like a wedge perpendicularly; those of Tuscany resemble a shovel, eight or nine inches long, and nearly as broad, and act horizontally."* And it is impossible to say what we might not have been using for ploughs even here, were it not for the exhibitions. The remnants of old ploughs exhibited at the show a year or two since, so shocking to look at, have been made to do the ploughing within the memory of many, and would run still were there none better. But for the public ploughing match, the splendid "Lion, No. 61," of Parker, Gannett and Osgood, would never have been, and the ingenuity and enterprise of that firm would have run in some other direction. It may be true that other ploughs have their valuable points. We know that competition, as before said, is violent, and many a man would die in the furrow, before he would yield and admit that any other plough could be equal to his

* A friend at my side during this present writing, lately from California, says he has seen great numbers of Spaniards ploughing, (rooting?) with a part of a tree, a little piece of iron stuck on in the place of a point, and the Spaniard having apparently no idea of any thing whatever or wherever better.

own. It is well that the world is wide, and fields are so open and the play so fair.

In looking at the operation of ploughing at the show, it was impossible to overlook the fact that this grand instrument, aside from its use as a plough, is a wonderful thing as a mere mechanical power. In 1424 the day's work of a man in Scotland was settled by law to be the digging of a piece of ground "equal to seven square feet." Compare this with the work at the exhibition in Danvers, where a man with different diggers, and the help of two oxen only, turns 7,260 square feet of turf land bottom up in thirty-five minutes by the watch!

A careful calculator in an agricultural journal says that one inch in depth of an acre of soil weighs about one hundred tons. Of course six inches, (the depth ploughed by single teams,) would weigh six hundred tons. Suppose the team to plough but one acre in a day, and to cut the turn fourteen inches wide, the plough in that case moves six hundred tons 14 inches, or $1\frac{2}{12}$ feet. But at a fair speed the team would plough two acres, making twelve hundred tons moved that distance in one day. In what other way could the strength of oxen be applied to procure such results, taking the body to be moved in such a situation as we find the soil?

One other topic, wholly incidental, may be mentioned in this connection, which may prove interesting to the leg-aching, boy-driver, who often wishes he knew how far he travels in ploughing a given time. Mr. Pusey says that "in cutting a furrow nine inches wide, the team travels eleven miles in ploughing an acre." Consequently by cutting twelve inches wide, the travel would be eight and a quarter miles, or at fourteen inches the travel would be seven miles and some twenty rods. This is a small amount of travel, and goes to show that the apparent fatigue of the team when the draft is easy, is only apparent. By cutting furrows twelve inches wide only, the travel for two acres would be but sixteen and a half miles. And when the farmer's fields are cleared of rocks, and Lion ploughs are put into them, the farm-ploughing may become as expeditious, if not so exciting as the match-ploughing now is. And may we not hope for the permanent benefit of our farms, that the mowing machine, together with the plough, will use such an argument for digging rocks, as shall in its consequences

speedily take all the killing, hard work of mowing and ploughing off of the man who cannot bear it, and put it on the team that can.

DAVID CHOATE, *Chairman.*

WORCESTER NORTH.

From the Report of the Committee on Single Teams.

In the judgment of your committee, such ground should be selected, if possible, as will compare with the average of our farms in this part of the county, and then real skill and merit, amid difficulty and embarrassment, will bring out the true mettle and character both of the team and the ploughman. How many of us have been deceived in relation to the real character of what we supposed to be an affectionate husband, or an amiable wife, or fond and dutiful children, until opportunities have offered for us to "look behind the curtain" and listen to their family jars, and personal recriminations, when amid difficulty and disappointment, passion for the time has held sway. So may we be deceived in relation to the real merit of the ploughman and his team, if there are no stones, roots or bogs to irritate his temper, or turn aside his plough and perplex his cattle. Our object is, not to see how well a man and team can do under the most favorable circumstances, but rather to develop the skill and habits of the team and driver, as they may be seen on his own farm and away from restraint, amid the ordinary duties of every day life. We have heard some ploughmen use very different language to their teams on the public highway, from that indulged in on cattle show day.

J. S. BROWN, *Chairman.*

MANURES.

HAMPSHIRE, FRANKLIN AND HAMPDEN.

Statement of Moses Stebbins.

Guano.—Having entered for premium crops of wheat and rye, also experiments with Peruvian guano, I herewith present a statement for your consideration. The field on which I have used guano, contains eight acres, situated at the foot of Sugarloaf mountain, consisting of loam, sand loam, with a coarse sand subsoil, clay loam, and red gravel, commonly called Sugarloaf gravel; each variety of soil has been treated alike with guano for five years in succession. It has been in pasture prior to 1848, when I broke up one acre for an orchard, planted with potatoes, with plaster in the hill.

In 1849, I ploughed one and one-half acres more, making two and a half acres, which I planted with potatoes as before. In May, 1850, I spread 6,000 pounds lime, fourteen bushels salt, six bushels plaster, on the two and a half acres, harrowed it, and set one acre to apple trees, and planted the whole with potatoes; harvested a fair crop. In 1854, I set the remainder, one and a half acres, with trees, and planted it with potatoes. In 1855, I added five and a half acres more to the field, making in all eight acres of land inclosed.

In May, 1855, I purchased 4,800 pounds of guano, at a cost of $54 per ton in Boston. I sowed 4,000 pounds of the same on the eight acres of land, or 500 pounds to the acre, and ploughed it in from six to eight inches deep, harrowed well and planted with corn, excepting the orchard, where I planted three rows potatoes by each row of trees. I hoed the crops three times, and harvested by estimation, 400 bushels of corn and 40 bushels potatoes.

In April, 1856, I sowed 150 pounds of guano to the acre, and ploughed as before; sowed two acres of wheat and six acres of oats. Harvested in July, 30 bushels wheat, 200 bushels of oats.

In September, 1856, I sowed 1,200 pounds guano, ploughed in as before, and sowed five acres of wheat and three acres of

rye, on the sandy soil. In March, 1857, sowed 10 pounds clover seed to the acre, 80 pounds. Harvested in July, 1857, 104 bushels wheat and 94 bushels of rye.

In July, 1858, I cut more than sixteen tons of hay, worth $10 per ton. In September, I sowed 150 pounds of guano with 150 pounds of plaster to the acre, on five and half acres, leaving the orchard in grass, and sowed two and a half acres of wheat, three acres of rye. Harvested in July, 1859, $77\frac{7}{10}$ bushels of wheat; on one acre of rye, $26\frac{1}{2}$ bushels. The rye was so heavy that it fell down in June, consequently it did not fill. The rye this year was heavier strawed than in 1857.

I have used guano with good results on other lands, and consider it as valuable on loamy soils as on sand. But I invariably plough it in, and would mix plaster with it, as plaster is a retainer of ammonia. I think that my land has improved 100 per cent. with Peruvian guano.

The results of my five years' experiments with Peruvian guano are nearly as follows, viz. :—

1855.

Eight acres of land, valued at $20 per acre, $160. Interest on land,	$9 60	
4,000 lbs. guano, $60 per ton,	120 00	
Ploughing, planting, hoeing, harvesting eight acres, $15,	120 00	
		$249 60
Cr.		
By 400 bush. corn, 5 shillings per bush.,	$333 33	
8 tons corn fodder, $6,	48 00	
40 bushels potatoes, 50 cts.,	20 00	
		401 33
		$151 73

Dr. 1856.		
To 1,200 lbs. Peruvian guano,	$36 00	
4 bushels seed wheat, $2,	8 00	
15 bushels oats, 50 cts.,	7 50	
ploughing, sowing, harvesting, $6,	48 00	
interest on land,	9 60	
		$108 10

Cr.			
By 30 bushels wheat, $2	$60 00		
200 bushels oats, 50 cts., . . .	100 00		
4 tons straw, $6, ...	24 00		
		$184 00	
			$75 90

Dr. 1856–7.			
To 1,200 lbs. guano, ...	$36 00		
7½ bushels seed wheat, $2.50, . .	18 75		
3 bushels rye, $1, ...	3 00		
ploughing, sowing, harvesting 8 acres, $7,	56 00		
interest on land, $200, ...	12 00		
		$125 75	
Cr.			
By 104 bushels wheat, $2.50, . . .	$260 00		
94 bushels rye, $1, ...	94 00		
6 tons straw, $6, ...	36 00		
		390 00	
			$264 25

Cr. 1858.			
By 16 tons hay, $7, ...	$112 00		
interest on land, $12, ...	12 00		
		$100 00	

Dr. 1858–9.			
To 800 lbs. guano, ...	$24 00		
800 lbs. plaster, ...	4 00		
4 bushels seed wheat, $2, . . .	8 00		
3 bushels rye, $3; interest, $12, .	15 00		
ploughing, sowing, harvesting, &c., .	30 00		
		$81 00	
Cr.			
By 77$\frac{7}{10}$ bushels wheat, $2, . .	$155 40		
79½ bushels rye, $1, ...	79 50		
3½ tons straw, $6, ...	21 00	255 90	
			$174 90

The sum total of expenditures is, ...	$576 55
Income of products of five years, ...	1,331 23
Balance in favor of guano, ...	$754 68
To which may be added improvement on land, . .	160 00
	$914 68

South Deerfield, November 15, 1859.

HAMPDEN.

Statement of Dr. L. Long.

My method of manufacturing and applying manure during the last two years, has been as follows:—First, I manufacture all the manure under cover, having a cellar under the whole barn. Good soil is obtained from ridges and corners of fences, dropped through the barn floor into the cellar. A sufficient quantity of soil to absorb the liquid, say one foot in depth, is kept under the stable, which, when saturated, is shoveled out with the superincumbent solid manure, and composted—three parts of soil to one of manure, thoroughly mixed,—with refuse lime, ashes and plaster sufficient to retain all the ammonia. This process is repeated about once in three weeks. The compost heap is repeatedly shoveled over, so that when it goes into the ground we intend to have it mixed at least six times, and the more good ingredients the better.

Besides this shoveling, three hogs are usually kept constantly on and amongst the manure. All the litter, straw, potato tops, buts of corn-stalks, &c., are by them well rooted, and disappear in the general mass. All the droppings in the barnyard, (which is water tight,) are thrown into a heap, and nothing is allowed to evaporate.

My method at the barn, where I keep my family horse, is this. I have a pen fourteen feet square, excavated three feet deep, and flagged with flat stones; opening into this is the privy vault, over it is the hen roost, and into it is thrown all the horse manure, litter, soap-suds and every thing that would cause an offensive smell, or contribute to the manure heap. In this pen a hog is kept the year round, who, when properly supplied with soil, is required to do the composting. We keep a depth of soil

under the horse stable, which is shoveled into the hog-sty once a year. We keep two horses, six or seven cows, three hogs; manure and cultivate eight acres, and mow eight acres.

Second. *Application.*—We mix all our manure with the soil, and use no top-dressing, except plaster and ashes. We sprinkle each load of manure with plaster, and each heap, when dropped; if it is to stand in heaps some days, each one is sprinkled with loam; when spread for ploughing, a small breadth is spread at a time, and immediately sowed with plaster, thus holding all the gasses until covered by the plough. When we stock down with English grain, wheat, rye and oats, we apply oyster shell or refuse lime, from ten to one hundred bushels to the acre.

Third. *Results.*—We have raised, of wheat, on an acre, in 1858, thirty and one-fourth bushels; 1859, thirty-seven. We have raised, of corn, in 1858, seventy-five bushels; 1859, not harvested, probably sixty. Of cabbage, three thousand heads, about ten tons, sold for $200; of potatoes, two hundred bushels; grass crop, from two to three tons per acre. The result of lime sowing on grass lands is an abundant crop of clover, without sowing any seed. We sow one peck of Timothy and one peck of red-top to the acre, and for the first two years the clover takes the lead. We use about one hundred pounds of guano mixed with plaster, on cabbage, annually sprinkled about the roots, and immediately hoed in.

Holyoke, October 12, 1859.

PLYMOUTH.

Compost Manure.—What bank capital is to the merchant, the compost heap is to the farmer; only the investment of the capital stock of the latter is found to be generally far more sure, safe and reliable, than that of the former.

It cannot be too strongly urged upon our farmers, in the language of the old Roman agriculturist, Cato, "Study to have a large dunghill." With it, the farmer can accomplish everything that others have done before him; without it, he is as though his hands were tied, he can do nothing. In the first place, it ought to be the duty of farmers to gather together all the materials and to permit no waste. Instead of permitting

stock to spend the greater part of the day in winter in the fields, keep them stalled and littered. Instead of leaving the manure of cattle in the yard exposed to the sun and rain, it should be kept in barn cellars, or in sheds, which can be made of rough boards at a trifling expense.

Manure which is protected from evaporation, washing, or drying up, is richer and stronger than that which is exposed.

The advantage of cellars for manure is, that they keep it in its natural condition, unchanged, and therefore secured against waste. The system of feeding in stalls, or, in other words, housing cattle summer and winter, instead of the yard system, is strongly recommended on account of the better quality of manure so produced. The following analysis, made lately at an English agricultural college, shows the difference in stall manure and yard manure, that which was sheltered and that exposed.

	Stall manure. Per cent.	Yard manure. Per cent.
Water,	71.00	71.00
Nitrogenized matter, capable of yielding ammonia 100 parts, dried,	2.37	1.07
Salts soluble in water, containing organic and inorganic matter,	10.07	4.06
Organic,	5.42	1.82
Inorganic,	4.28	2.78
Phosphoric acid,	0.03	0.26
Alkalies, potash and soda,	2.00	0.08

Again we repeat, study to have a large dunghill and a good one.

[Grain Crops.—So many of the awards on grain crops were made contrary to law that the statements cannot be regarded as of value and are of necessity omitted. Section 2 of chapter 232 of the Acts of 1859 reads as follows:

"No incorporated agricultural society shall award a premium for a field crop, without satisfactory evidence, under oath, presented to its committee or other officers, that the whole merchantable crop so entered has been weighed when harvested, if a grass or root crop, and when threshed or husked, if a grain or corn crop." See Appendix.

According to the statements and reports of committees as returned, it appears that several of the societies were not aware of the requirements, and, doubtless unintentionally, failed to comply with the above section. Special attention is therefore called to it, as a strict compliance with the law will in all cases be required.—Ed.]

INDIAN CORN.

PLYMOUTH.

From the Statement of the President.

Since the last annual meeting the supervisor of the society weighed out on the first of January 103½ bushels of merchantable shelled corn, of the Whitman, or Smutty White variety, the product of a single acre, grown by Robert Perkins, Esq., the treasurer of the society in 1858. It was proved from various experiments of the two last years, that the shrinkage upon corn between October and January varied from 18 up to even 30 per cent., so that it would be fair to estimate the weight of this corn at the time of harvesting at 120 or 130 bushels, and the supervisor informs us that he has no doubt Mr. Perkins might have raised more corn in that season, had he planted nearer, or in drills. The year 1858 was not favorable to the growth of corn.

We have thus set at rest the numerous doubts, we might almost say sneers, with which we have been harassed by some of our agricultural friends, who would not believe that one

hundred bushels can be raised upon an acre, and who have even doubted the word of our previous supervisors, when they made, at the time of harvesting, an honest estimate of one hundred and thirty to forty bushels to an acre.

The premiums for Indian corn weighed and shelled on the first of January have been renewed, and the experiments will we trust be pursued for years to come, until all doubts shall be set at rest.

From the Report of the Committee on Produce.

Indian corn is not only one of the best and most profitable crops raised in Plymouth County, but it is generally the surest, though this year our farmers have suffered much by the untimely frost in September. This shows the desirability of selecting those kinds of corn which will not only yield well, but mature early.

This matter of varieties is one of the most important in the economy of Indian corn, and it may be suggested that it would be desirable that any one having well defined varieties, of which he knows the history and qualities, the ripening, cultivation or yield, would send a specimen, with a particular and full account of all he knows about it, to the secretary of the Plymouth County Society, for transmission to the Secretary of the Board of Agriculture. There is in Boston a cabinet to receive the various kinds of corn, and as received, each specimen is labelled, by which means facilities are offered for comparing one sort with another. To the agriculturist *true* in heart, it is a pleasure and a *sign* to see improvements each year made in the cereals, and to see a manifest and growing desire to procure the improved breeds of cattle, sheep and horses. If it is a satisfaction to see such things, how much room is there to enlarge the bounds of improvement in the filling up and reclaiming our low meadows, and making the wastes "blossom as the rose."

Report of the Supervisor on Shelled Corn.

Having finished the shelling, weighing and measuring of the several acres of Indian corn entered for the society's premium No. 27, I present the following result of the experiments:—

The whole number of competitors who entered for this premium was eleven. Four of these, for various reason, abandoned the enterprise before harvest, and of the remaining seven, two withdrew their claim before January.

From each of the seven acres, I harvested two rods in October, selecting, as near as we could judge, average rods, or as good as the fields would average.

This corn I took home with me, spread it separately on high scaffolds in my barn, where it had a good circulation of air through two open windows, and I shelled, weighed and measured it on the first week of January, 1859, with the following results:—

Table of the Two Rods kept by the Supervisor.

Weight.		Oct. 1858. lbs.	Jan. 1859. lbs.	Shelled. lbs.	Shrinkage in lbs.	Shrinkage per ct.
Robert Perkins's	2 rods,	118$\frac{1}{4}$	92	77	26$\frac{1}{4}$	22.2
George W. Woods's	"	128$\frac{1}{4}$	95$\frac{1}{2}$	78	32$\frac{3}{4}$	25.53
James Howard's	"	100	77	65	23	23
Friend W. Howland's	"	97	75	62$\frac{1}{4}$	22	22.6
Nathan Whitman's	"	96	74$\frac{1}{2}$	59$\frac{1}{2}$	21$\frac{1}{4}$	22.4
Jona. Copeland's	"	90	71$\frac{1}{2}$	57$\frac{1}{2}$	18$\frac{1}{2}$	20
Nahum Snell's	"	88	67$\frac{1}{2}$	55$\frac{3}{8}$	20$\frac{1}{2}$	23.2

Table of the Whole Acre, including the Two Rods.

Weight.	Oct. 1858. lbs.	Jan. 1859. lbs.	Shelled. lbs.	Shrink. lbs.	Shrink. per ct.	Bushels measured.	Bushels of 56 lbs.
Robert Perkins,	8,518	6,827$\frac{1}{2}$	5,716	1,690$\frac{1}{2}$	19.84	103$\frac{1}{2}$	102
Geo. W. Wood,	6,998$\frac{3}{4}$	5,601$\frac{1}{2}$	4,588	1,397$\frac{1}{4}$	19.96	90$\frac{1}{2}$	81$\frac{44}{56}$
James Howard,	6,356	5,175$\frac{3}{8}$	4,364	1,180$\frac{5}{8}$	18.57	–	77$\frac{52}{56}$
Nahum Snell,	6,303	5,074	3,822$\frac{3}{4}$	1,229	19.49	65$\frac{1}{2}$	68$\frac{1}{56}$
Jona. Copeland,	5,585	4,353$\frac{1}{2}$	3,635	1,231$\frac{1}{2}$	22.5	62$\frac{3}{4}$	64$\frac{24}{56}$

Calling 56 pounds of shelled corn a bushel, the greatest amount was 102 bushels, by Robert Perkins, of Bridgewater, the next greatest by George W. Wood, of Middleborough, 81$\frac{44}{56}$ bushels, and the third in amount by James Howard, of West Bridgewater, 77$\frac{52}{56}$ bushels.

The other competitors for this premium raised corn of an excellent quality, mostly yellow and very heavy, weighing fifty-eight pounds and upwards per bushel, as commonly measured. Mr. Nathan Whitman's corn was harvested with due care and weighed at the time of harvest, but unfortunately got mixed with another lot of corn in his crib, by the breaking away of a partition between them.

Mr. F. W. Howland, of South Hanson, had a very fine field of corn, a part of which was white and a part yellow. The land was an old bushy pasture. It was cleared and planted, and attended with much labor and care, and had he been permitted to harvest it, he would doubtless have given us an accurate and interesting statement of his proceedings and success. But some of the corn having been stolen from the field a short time before harvest, it was impossible for him to give an accurate statement of the amount of the crop. The corn, however, that was saved, was shelled and weighed in January. It weighed about sixty pounds per bushel. I have been waiting for his statement of the manner of raising this crop, and of the amount saved, but have not received it.

You will perceive by this report, that a few days in the month of October greatly varies the weight of a field of corn. The shrinkage on the corn which I took home, from the 6th to the 9th of October, was found to be from 20 to $25\frac{1}{2}$ per cent. when weighed in the first week of January, while the corn which remained in the field from five to ten days later, shrank $18\frac{1}{2}$ to $22\frac{1}{2}$ per cent. between the time of harvest and January, making, on an average, about 3 per cent. difference.

The five lots of corn in the foregoing table together weighing in January 27,032 pounds, and yielding 395 bushels of 56 pounds each, required on an average 68.43 pounds of ears for one bushel of shelled corn.

Now if we estimate 85 pounds of ears at the time of harvest to yield 56 pounds of shelled corn, and the shrinkage is upon an average 23 per cent., we have heretofore committed an important error in reckoning 85 pounds for a bushel of the specimen rod. For although 85 pounds of ears at the time the farmer gathers in a field of maize, may on an average give

56 pounds of shelled corn, yet the supervisor usually selects his rod or two rods several days before the rest of the field is harvested, and in those intervening days the ripening corn will shrink from two to five per cent. Take Mr. G. W. Wood's corn, for example. The two rods which I gathered October 7th, shrank $25\frac{1}{2}$ per cent., while the rest of the field, harvested about the last of October, shrank only 19.96 per cent., making more than $5\frac{1}{2}$ per cent. difference. This corn was rather green at the time of harvest, and being on low ground did not ripen so fast as it would have done on higher and warmer land.

With Mr. James Howard's corn, the case was different. His two rods, gathered October 6th, were riper and on higher land; this shrank in weight 23 per cent., while the whole acre, harvested some ten days later, (being in such a state of forwardness that the ripening process was more rapid,) arrived to such a state of dryness during the intervening ten days, that it shrank in weight only $18\frac{57}{100}$ per cent. to the first of January; thus making a difference of nearly $4\frac{1}{2}$ per cent. in the shrinkage between the specimen rods and the whole acre. Thus you may perceive that the difficulties are numerous and various in obtaining an exact estimate of an acre of corn from the weight of a single rod taken from the field even but a few days before the whole is harvested.

But with all these difficulties, so various and so numerous, the experiments which have been made under the offer of this premium have shown us to a demonstration, that more than one hundred bushels of good, sound corn can be raised on one acre of land in Plymouth County. Also, that 85 pounds of ears, at the time corn is usually gathered into the crib, will yield a bushel, or 56 pounds of shelled corn; and yet, if we take 85 pounds of ears from different fields of different varieties of corn, and different degrees of ripeness consequent upon the varieties of soil, the modes of culture, the kinds and application of manure, several days or weeks before the whole field is in a suitable state of ripeness to put away in the crib, 85 pounds of ears would not be sufficient to allow for a bushel, and I know not what number of pounds could be adopted as a uniform standard; and to make an allowance in weight where corn is dry, and very dry, damp, and very green,

would be as uncertain a method of computation as resorting to guess-work.

Let us take the weight of George W. Wood's acre at the time of harvest, 6,998.75 pounds, and divide it by 85 pounds, and we have 82.33 as the number of bushels of 56 pounds each on the acre, which differs but a small fraction from the amount actually weighed and measured. Now, suppose we estimate the specimen rods, to learn how many pounds of ears were needed for a bushel of shelled corn, and we have the following answer: 78: 128.5 : : 56: 92.9. Thus, if 78 pounds of shelled corn required 128.5 pounds of ears, 56 pounds of shelled corn will require 92.9 pounds, or nearly eight pounds more than the standard, 85. Now, if we had in this case estimated the whole acre from the specimen rods, and reckoned 85 pounds of ears for a bushel, we should have called the product 120 bushels; whereas, it was only about 82, a little more than two-thirds of what we should erroneously have supposed. How many such estimates have been made in years past, it is not easy to determine.

So of Mr. Perkins's corn. Divide the whole weight at the time of harvest, 8,518 pounds, by 85, and we have a quotient of 100 and 18 remainder, coming within two bushels of the actual measurement. But had we estimated the whole field from the specimen rods when taken, we should have reckoned nine bushels too much. And yet, this corn would from the specimen rods, have required 86 pounds of ears for a bushel of shelled corn. For as 77: 118.25 : : 56: to 86.

And now leaving this department to the oversight of others, I would express the hope, that the experiment continued another year, under the supervision of a new committee of practical farmers, will develop new facts of public utility, and fully accomplish the end for which it was designed.

F. P. Howland, *Supervisor.*

Statement of Robert Perkins on Shelled Corn.

The acre of land entered by me for premium on corn, is of an uneven surface, in part gravelly loam, in part reclaimed meadow. It is hard and some parts stony, with a fair depth of good soil, generally a clayey subsoil, not easily cultivated, and not such land as would ordinarily be selected for growing Indian

corn successfully. About one-half of the piece was ploughed eight years ago, and has been in sward since, the low, wet part where grew skunk cabbage and bulrushes, I underdrained in 1857. Ploughed the land November 5th, 1857, with a Michigan plough, nine inches deep; the manure used was bought at stables in the village, carted last fall, piled up on the lot and covered with soil.

In the spring harrowed the ground, spread on the manure and cross-ploughed it in with horse-plough, not disturbing the sod more than could be avoided, and harrowed it again; furrowed the ground both ways, rows three and a half feet apart one way, two feet apart the other way; put a small quantity of good, fine compost in each hill; in all ten horse loads. May 20th, planted the smutty white corn, called Bryant's improved Webster corn, obtained of Dion Bryant, who for twelve years past has selected his seed from the earliest and ripest ears in the field, used seed from middle of the ears, rejecting the two ends; carefully planting six kernels in a hill, about two inches apart. Hoed the corn three times, first and second hoeing used a cultivator, third hoeing used a plough; the corn came up well, scarcely a kernel missing. At second hoeing thinned it out, leaving four plants in a hill; the stalks were cut about the 10th of September. October 9th, Mr. Howland (the supervisor) selected two parcels of one square rod each, in different parts of the field, as an average, harvested and weighed, as follows:—

One rod weighed 56½ pounds, one rod 61¾ pounds—118 pounds. Making 2¾ bushel baskets of ears.

From October 18th to October 22d harvested the balance, which weighed 8,400 pounds, and measured 197 bushel baskets. Whole acre weighing 8,518¼ pounds, and measuring 199¾ baskets.

This corn upon the 158 rods was put into a crib built out doors, sixteen feet long, three feet wide at bottom, four feet wide at top, made of fence picks seven feet long, three inches wide, put on three-quarters of an inch apart.

The corn raised on two square rods was taken by Mr. Howland to Abington, and January, 1859, was shelled and weighed by him.

Weight of corn, 77 pounds; cobs, 15 pounds—92 pounds.

January 6th, Mr. Howland weighed and measured the corn on 158 rods.

Corn, 5,639 pounds; cobs, $1,096\frac{1}{2}$=$6,735\frac{1}{2}$.

Whole weight of corn and cobs in January, 1859, $6,827\frac{1}{2}$.

Whole amount of shelled corn on acre weighed 5,716 pounds, and actually measured $103\frac{1}{2}$ bushels, equal to $102\frac{4}{56}$ bushels of 56 pounds per bushels.

I planted two rows of potatoes around the corn, and when the land was measured by A. Hale, Esq., at harvesting, I had about one bushel of corn outside of the acre, which was sold and removed before harvesting, and the potatoes and corn are included in the following memorandum of expenses.

1857.	EXPENSES.	
For ploughing,		$5 50
77 horse loads stable manure,		77 00
10 horse loads compost manure,		10 00
carting manure,		14 00
1858.		
For $13\frac{1}{2}$ days preparing and planting,		13 50
5 days horse and cart,		5 00
seed corn,		1 50
first hoeing,		5 25
second hoeing and thinning,		6 25
third hoeing and thinning,		7 00
cutting stalks,		4 00
harvesting,		14 00
		$163 00

Bridgewater, January 6, 1859.

HAMPDEN.

Statement of H. M. Sessions.

The crop of corn that I present for your consideration was raised on three acres of land, from which a crop of corn was taken last year. Sixty-four loads of manure were ploughed in the third week in May, and the corn planted the 26th and 27th of May. The Demond corn was planted, three feet apart each

way, with ashes and plaster in the hill, at the rate of two parts of ashes to one of plaster. It was hoed twice, and cut up the last week in September. The leaves were touched by the frost each month of its growth. The 12th of June, when it was ready for hoeing, it was cut down to the ground. Most of it grew again, but not large enough to hoe till the 23d and 24th of June. The night of the 4th of July it was touched by the frost again, also on the last of August. The middle of September the frost was so hard that some of the later was injured. Besides the cold, unfavorable season which checked its growth, seventy-five turkeys and hens destroyed a portion of it near the house and barn. Considering these obstacles the crop turns out much better than we expected. Three hundred and seventy-three bushels of ears have been husked from this lot, one bushel of ears yielding twenty-one quarts of shelled corn. At this rate there would be two hundred and forty-four bushels and twenty-five quarts on the lot, or a fraction over eighty-one and one-third bushels per acre.

Value of 244¾ bushels of corn, at $1 per bushel,		$244 75
Corn fodder, at $10 per acre,		30 00
		$274 75
64 loads of manure,	$32 00	
Ploughing,	7 00	
Planting,	6 00	
Seed and plaster,	2 00	
Hoeing twice,	10 00	
Cutting,	6 00	
Husking, at 3 cts. per bushel,	11 19	
Interest on land,	15 00	
		89 19
Net profit,		$185 56

South Wilbraham, October 12, 1859.

WHEAT.

MIDDLESEX NORTH.

Statement of William and L. McFarlin.

The half acre of wheat we enter consists of a loamy, gravelly soil, having been nearly run out. It was first ploughed in the fall of 1856. In the following spring it was ploughed again, with three cords stable manure spread on and ploughed in. It was then planted with corn, which yielded at the rate of seventy-five bushels to the acre. In the spring of 1858 we manured the same as the previous year, and planted it the same, and it produced eighty bushels to the acre. This year we did not manure it. We ploughed, and sowed wheat at the rate of two bushels to the acre. We harvested on the 16th of August, and after being threshed, it weighed 853 pounds, equal to $15\frac{13}{56}$ bushels.

1856.	First ploughing,	$2 00
1857.	First ploughing,	1 50
	3 cords manure, (one-half for the crop,	7 50
	Second ploughing,	1 50
	Planting and harvesting the corn,	4 00
1858.	3 cords manure, (one-half for the crop,)	7 50
	First ploughing,	1 50
	Planting and harvesting,	4 00
1859.	First planting,	1 50
	1 bushel wheat,	2 00
	Harrowing and bushing,	75
	Harvesting and threshing,	4 25
		$38 00

Receipts.

1857.	$37\frac{1}{2}$ bushels corn,	$37 50
	Stalks,	2 00
1858.	40 bushels corn,	40 00
	Stalks,	2 00
1859.	$15\frac{13}{56}$ bushels wheat,	30 47
		$111 97

HAMPSHIRE, FRANKLIN AND HAMPDEN.

Statement of Theophilus P. Huntington.

My crop of wheat, which is entered for a premium, grew on one acre and about ninety-five or one hundred rods. This ground produced a light crop of clover in 1856. It was mown twice, and the next year, 1857, scarcely a spear was on the field, and there was no grass worth the harvesting. In 1858, 50 one-horse loads of green manure were ploughed in, and 20 loads of rotten manure harrowed in. The ground was then planted with potatoes, a handful of plaster and ashes being applied to each hill. About the 20th of April, 1859, the land was ploughed and sown with 2½ bushels of Scotch pipe wheat, and well harrowed, (grass seed was afterwards rolled in.) The crop was harvested the 11th of August, and threshed in September, by hand. The produce was 41 bushels of wheat, and 1½ tons of straw.

My account with the crop stands as follows:—

41 bushels of wheat, weighing 61 pounds to the bushel,	$82 00	
1½ tons of straw,	7 50	
		$89 50
Ploughing, sowing and harvesting,	$3 00	
2½ bushels seed,	5 00	
Harvesting, $3, and threshing and cleaning, $7.50,	10 50	
		18 50
		$71 00

HAMPDEN.

Statement of Dr. L. Long.

The ground upon which I raised my wheat measures 169 rods; soil, a loam—having been in cultivation four years. The wheat crop followed cabbage, with the exception of a strip about one rod in width, which was preceded by a potato crop. This could be distinguished throughout the season as inferior to that following cabbage. The same was observed in the crop

of the previous year. One hundred bushels of gas lime, which had lain out exposed to the weather, was spread and ploughed in when the grain was sown, the ninth of April, and seeded with one peck each of Timothy and red-top. The grain, previous to sowing, was steeped four hours in a solution of sulphate of copper—four ounces to two gallons of water—sufficient to cover the grain, and dried fit for sowing, by mixing with plaster. The wheat was allowed to ripen fully. It was perfectly free from rust or smut, and reaped by hand. It was threshed and cleaned in September, measuring thirty-eight bushels and ten quarts, weighing sixty-one and one-half pounds to the bushel, making about thirty-seven bushels to the acre. The flour is excellent, the grain being clean and very plump; and, for aught I know, perfect for the kind, it being Red Beard Wheat.

I would remark that wheat does better after cabbage, tobacco, or turnips, than after the edible grains or potatoes. Lands in our vicinity seem to be exhausted of the lime, and restoring it gives a stiff straw and full berry to the wheat, and in the grass crop an abundance of clover.

Value of 38 bushels wheat, at $2 per bushel,		$76 00
Straw,		20 00
		$96 00
Interest on land,	$6 00	
Taxes,	75	
Ploughing and sowing,	2 00	
Seed—two bushels,	4 00	
Lime, nothing but drawing, and worth more in land than cost.		
Threshing and cleaning,	3 00	
Expenses,		15 75
Net profit,		$80 25

Holyoke, October 12, 1859.

BARLEY.

WORCESTER NORTH.

Statement of Benjamin Safford.

The soil where my barley grew is a gravelly loam. The crop of 1857 was corn and turnips, with about seven cords of compost, mostly stable manure, per acre; that of 1858, corn manured as in 1857. It was ploughed, April 18 to 20, once, six to seven inches deep; harrowed both ways; sowed, April 22, without manure, with three and three-fourths bushels common two-rowed barley per acre, and mowed the last week in July.

Cost of ploughing and harrowing, . .	$3 00	per acre.
Seed and sowing, ...	3 90	"
Total, except harvesting and threshing, .	$6 90	per acre.

I consider the straw worth the expense of harvesting and threshing.

Produce, $22\frac{1}{2}$ bushels of barley, which weighed 51 pounds per bushel on 79 rods, equal to $45\frac{1}{2}$ bushels per acre by measure, or $48\frac{1}{3}$ bushels by standard weight.

OATS.

MIDDLESEX SOUTH.

Statement of S. D. Davenport.

The 172 rods of land surveyed by William F. Ellis, Esq., on which my oats were raised, is a heavy loam, with clay bottom. It had a good coat of manure in 1857 and 1858, and was planted with corn each year. Early in the spring of 1859 I sunk about one-fourth part of the rocks and all the small stones on the piece. This I did for two reasons—one to get rid of the stones, the other because the land is very wet in the

spring of the year, and had the tendency to drain it. I had tried the experiment on a piece of land I had sown with carrots for the last seven years, without much success. At last, I sunk all the rocks, and found my crop almost doubled. I met the Hon. Simon Brown in Boston, and asked his opinion on sinking rocks; he told me the soil in Concord was very much like that in Hopkinton, and that he would not have his rocks taken out, if it could be done without any expense to him. I am of the same opinion from the experiments I have made, and think I had at least one-third more oats than I should have had if the rocks had been dug and drawn off. After putting on five cords manure from the yard, I ploughed the 18th day of April the first time, and crossed it a week after. May 2d, Anthony Kearns sowed it, putting on two bushels oats I bought at the store, which came from Albany, likewise eight pounds clover, one-quarter bushel Timothy, and one-half bushel red-top seed, which took well. The oats and grass seed were sowed even, the most so of any I ever saw. The oats were harvested the 10th, 11th and 12th of August, the whole piece stood as straight as a candle, and would average five feet high. The land is worth $100 for cultivation. I have sold most of the straw for $1 per cwt. for filling beds, and can readily sell the balance for the same price.

VALUE OF CROP.

87 bushels oats, 32 pounds per bushel at 55 cts., .	$47 85
4,500 pounds straw, at $1, ...	45 00
	$92 85

EXPENSES.

Ploughing, sowing and harrowing, . . .	$4 25
2 bushels seed oats, ...	1 50
Harvesting, ...	6 38
Threshing and cleaning, ...	4 12
Manure and applying, ...	20 00
Interest on land and taxes, ...	7 20
	$43 25

Deduct one-half of the expense of manure for the better condition of land after the crop was taken off, ...	$10 00	
		$33 25
Profit, ...		$59 60

I hereby certify that all the above statements are correct.

ANTHONY KEARNS.

HAMPDEN.

Statement of H. A. Fuller.

The acre of oats of which I showed a sample, was raised by me the past season at North Brook; soil, sandy loam; subsoil, clay. In the spring of 1858, forty-one horse cart loads of barn or stable manure from a cellar, were ploughed under, and planted with corn. In April, 1859, it was ploughed nine inches deep, and twelve bushels of slacked lime spread evenly over the furrows and thoroughly harrowed. I sowed four bushels of common oats weighing twenty-five pounds to the bushel; harrowed well, picked the corn stalks and stubble off the surface, and rolled with a heavy roller. When the time came for harvesting, we found them badly tangled; the largest piece standing was fifteen by twenty feet in one place, which we cut with a sickle, and dried and threshed carefully. We had twenty-two and one-half quarts, weighing twenty-two and one-half pounds of oats, from thirty-two and three-fourths pounds of straw. Thinking this was a large crop, and as we could not thresh at present the whole crop, we threshed twenty sheaves as they came from the mow, and measured sixty quarts, weighing fifty-eight and three-fourths pounds; the straw weighed eighty-nine pounds, and from this we make the estimate.

Value of 100 bushels oats at 60 cents, . . .		$60 00
Two and a half tons straw at $7, ...		17 50
		$77 50
Ploughing, ...	$1 25	
Lime, ...	2 00	
Harrowing, ...	1 00	

Seed,	$2 00	
Sowing, harrowing and rolling,	2 00	
Harvesting,	4 00	
Threshing,	5 00	
Taxes and interest,	10 00	
		$27 25
Net profit,		$50 25

SPRINGFIELD, October 31, 1859.

The above work was all done by me, or under my supervision. I know the items to be right, and believe the estimate to be low.

HARRISON ADAMS.

ROOT CROPS.

ESSEX.

Statement of Horace Ware.

CARROTS.—The field of carrots that I offer for your consideration contains two and a half acres, one-half acre of which produced 30,852 pounds, as per bills. The kinds raised were the Horn and Orange. The Horn produced the best. On another part of the field I had the Horn and Orange mixed in the seed, which produced better than either of the others. The reason of my not selecting my lot from them was that they were not so thick and I thought there would not be so good a yield, but in digging them I found that there were about two tons more on a half acre than of the Horn with less manure and culture, but I did not sell enough to get at the weight of the second half acre. On the land sown with the mixed seed I spread about eight cords to the acre of compost manure, half of which was kelp ploughed once five inches deep, harrowed and bushed; the after culture the same as the half acre that I offer for premium, which is as follows:

The land was in potatoes the two years preceding, and well manured; for the present crop two and one-half cords of

muscle mud were spread and ploughed in eight inches deep, and harrowed, then spread three and one-half cords of compost manure, same as above, and ploughed in seven or eight inches, harrowed and bushed. The seed was sown on the 28th of May in rows fourteen inches apart, the plants thinned to between one and two inches apart, hoed four times, and weeded three times.

Expense of crop:—		
Ploughing, harrowing and bushing, . .	$4 00	
Seed and sowing, ...	1 50	
Weeding and hoeing, ...	6 00	
2½ cords of mud at $4 per cord, . . .	10 00	
3½ cords of manure at $5 per cord, . .	17 50	
Harvesting, ...	10 00	
Marketing, ...	10 00	
		$59 00
Credit by 7,300 pounds carrots at 37½ cents per 100 pounds, ...	$27 37	
Credit by 23,552 pounds carrots at 45 cents per 100 pounds, ...	105 98	
		133 35
Balance, ...		$74 35

Marblehead, November 14, 1859.

Statement of C. P. Jaqueth.

Potatoes.—I enter for premium a crop of potatoes raised on eighty-seven rods of land, from which I harvested 136$\frac{47}{60}$ bushels, sixty pounds to the bushel, or about 251¼ bushels to the acre, of the Danvers reds.

About three-fifths was the previous year planted with corn and potatoes, with one shovelful of compost manure in the hill, and the remaining two-fifths was planted with potatoes the 24th of June, after the hay crop was taken off—which was very light—with plaster in the hill, at the rate of 2,200 pounds to the acre.

They were affected by disease, and consequently were almost a total failure.

On the ground on which the plaster was applied the previous year, the potatoes were much the best.

I spread $2\frac{1}{2}$ cords of compost manure from barn cellar after ploughing, harrowed once, furrowed lightly, four feet apart, cut and dropped six bushels of small sized potatoes, from one and one-half to two feet apart, covered with horse and plough by turning two furrows together.

My potatoes were large and smooth, and of the $136\frac{7}{60}$ bushels harvested, not over six per cent. were unfit for market.

I planted May 10th, and harvested during the month of September.

The cost of crop was as follows:—

Ploughing $2\frac{1}{2}$ hours, 2 men and 2 horses, . . .	$1 25
Carting and spreading $2\frac{1}{2}$ cords manure, . . .	1 25
Furrowing, dropping, and covering, ...	1 25
Cultivating twice, ploughing once, hoeing twice, . .	3 25
Harvesting, ...	6 00
Six bushels small sized potatoes at 40 cents per bushel,	2 40
$2\frac{1}{2}$ cords compost manure at $5 per cord, . . .	12 50
Total cost of crop, ...	$27 80

The $136\frac{7}{60}$ bushels of potatoes were sold in the Lawrence market at an average of $52\frac{1}{2}$ cents per bushel.

North Andover, October 27, 1859.

Statement of Willard Howe.

Parsnips.—The half acre of land on which the parsnips were grown is a light, sandy loam, and has been previously used, (eighteen or twenty years,) for onions, except last year, (1858.) It was sown one-half to carrots, the other half to onions.

The onions failed; it was then set with cabbage. The yield of parsnips on the half where cabbages grew was 17 bushels, the land and manure being equal.

The manure used was composed of equal parts of stable manure, night-soil and spent tan; well mixed and fermented manure spread and ploughed in, and fitted as for carrots or onions.

Seed sown 17th of May with a machine; the rows 17 inches apart, and the plants thinned to 3 inches.

Harvested by ploughing two furrows away from the row with the side-hill plough, the last furrow deep and close to the row with two horses; then they are dug easily with spade or shovel. The labor of horses offset against ploughing.

In all, 313 bushels of 45 pounds each, 299 of nearly even size, fit for family use. They will be for sale in February and March, and we hope to obtain the same price of last year—$1.50 per barrel.

In calculating expense of crop, I have charged $1.25 for men, $1.50 for horse per day, and what it cost for boys' labor.

Expense of crop:—		
Hauling manure, and spreading and ploughing,		$5 25
Hoeing and weeding,		5 75
4 cords manure, at $7 per cord,		28 00
Land rent,		6 00
1¼ lbs. of seed,		1 25
Harvesting, 8 days,		10 00
		$56 25
Credit by 100 barrels at $1.50 per barrel,	$150 00	
14 bushels at 20 cents per bushel,	2 80	
		152 80
Net,		$96 55

Danvers, November 14, 1859.

Statement of Franklin Alley.

Onions.—The piece of onions which I offer to your notice contains three-fourths of an acre, measured by Horace Ware, on which I put eight cords of manure, half horse manure and half kelp, well mixed together, and evenly spread on the land and ploughed in six inches deep and harrowed, ploughed the second time and raked by hand. The seed was sown in rows fifteen inches apart, with two pounds of seed on the 21st of April, and the ground kept clear of weeds. The land is of a dark loam with underdrain on part of it, and has produced

onions the last four or five years. The yield of onions the present year, as weighed, was 25,960 pounds, which sold at 75 cents per bushel delivered in Salem. The cost of cultivation by estimation is as follows:—

Ploughing,	$3 00
Harvesting and raking,	3 00
Sowing,	1 00
Seed,	5 00
8 cords of manure at $5 per cord,	40 00
Weeding,	25 00
Cost of cultivation,	$77 00

25,960 pounds at 50 pounds to the bushel,—519$\frac{1}{5}$ bushels.

Marblehead, November 9, 1859.

MIDDLESEX NORTH.

Statement of Joseph S. Farmer.

Onions.—I measured 1-16th of an acre of onions, from which I gathered 51 bushels. I measured the second 1-16th, from which I gathered 46 bushels. These lots were measured before they were pulled, and kept separate from any other. The ground upon which these grew was sown with carrots last year, and never with onions before. The ground was prepared at the rate of twenty to twenty-five loads of manure to the acre. They were sown about the 22d of April, with the rows 15 inches apart, and were weeded four times. The following is the cost:—

Ploughing ground twice and spreading manure,		$1 00
Seed and sowing,		1 00
Manure,		6 00
Weeding four times,		2 00
Harvesting,		2 00
		$12 00
51 bushels at 80 cents per bushel,	$40 80	

I measured one-eighth of an acre of carrots, and harvested from it 103 bushels, each weighing 148 pounds. The ground

was planted with cabbages last year, (which proved a total failure,) with about 25 cart loads of manure per acre. This year I did not put on a shovelful. I sowed them about the 25th of April, in drills 18 inches apart. They cost as follows:

Ploughing ground twice,		$1 00
Seed and sowing,		1 00
Weeding,		2 00
Harvesting,		2 00
Marketing,		3 00
		$9 00
4,800 lbs. carrots, at 60 cents per 100 lbs.,	$28 80	

Tewksbury, November, 1859.

MIDDLESEX SOUTH.

Statement of S. D. Davenport.

Carrots.—On the 43½ rods of ground on which my carrots, were raised, the soil is rich, having a thick surface of loam resting on clay bottom. I have ploughed it the last seven years, three times each year, from 8 to 12 inches deep. In 1857, the land being well stocked with rocks, I had them sunk at a cost of $40. I would not have had them dug and carried from the land, if it could have been done without any expense to me. Last spring I spread one cord of manure on the land from the yard. The first day of June I sowed three-fourths of a pound 16 inches apart, with a machine. I gave them three hand weedings, and when well up, sowed on 6 bushels ashes. Owing to the short, cold season, I have not had so small a crop for three years. There have been carrots raised on the same land for the last ten or eleven years, and my crops have improved in quantity and quality each year.

Cr.

By 251 bushels, of 12,550 pounds, at 30 cts. per bushel,	$75 30
Carrot tops,	1 50
	$76 80

Dr.

One cord manure and carting, . . .	$5 00	
Ploughing, $1.50, seed and sowing, $1, .	2 50	
Hoeing, $6, digging, $4, ...	10 00	
Interest and taxes on land, ...	3 60	
Profits, ...	55 70	
		$76 80

I can sell them quick for 30 cents per bushel. I would recommend all who can to cultivate this valuable root every year. At the present prices of grain and hay, I consider them worth $14 per ton. I never sell any of my carrots; I consider them very valuable for horses and milch cows.

Hopkinton, November 1, 1859.

I hereby certify that I raised from forty-three rods of land, two hundred and fifty-one bushels of carrots. Also on $31\frac{46}{100}$ rods of land, one hundred and ten bushels Swedish turnips.

S. D. Davenport.

I hereby certify that I measured the above turnips and carrots for S. D. Davenport, and his certificate is correct.

Anthony Kearns.

WORCESTER NORTH.

Statement of John Brooks, Jr.

Potatoes.—The half acre on which my Davis' seedling potatoes grew, is a wet soil, with a clay subsoil. The crop of 1857–8 was grass, without manure. It was ploughed once, May 29, about eight inches deep; furrowed, and manured with seven and one-half loads,* spread before ploughing, and 150 pounds plaster in the hill; planted, June 7, in hills, with seven bushels large potatoes, cut, two pieces per hill; twenty-four hills per square rod; hoed once, and harvested October 5.

* The statements concerning cultivated crops are made by the Secretary from the blank forms sent to the several competitors. In all cases where manure is estimated in loads, the loads are understood to contain thirty bushels each.

Cost of ploughing,	$1 00
Furrowing and applying plaster,	1 00
Manure,	9 37
Plaster,	75
Seed,	2 80
Planting,	1 50
Hoeing,	1 50
Harvesting,	1 50
Total,	$19 42

Produce October 3, 100 pounds per square rod—equal to 8,000 pounds, or 133⅓ bushels the half acre.

The half acre on which my St. Helena potatoes grew, is a muck-meadow, very cold, drained six years ago. The crop of 1857–58, was grass of very poor quality, without manure. It was ploughed once, June 11, about eight inches deep; harrowed once, furrowed, manured with eight loads, spread after ploughing, and ashes in the hill; planted June 11, with five bushels potatoes, cut, three pieces per hill, thirty hills per square rod; hoed once and harvested October 5.

Cost of ploughing,	$1 00
Furrowing and applying ashes,	1 00
Manure,	10 00
Ashes,	1 00
Seed,	1 25
Planting,	1 50
Hoeing,	1 50
Harvesting,	2 00
Total,	$19 25

Produce, as estimated by the committee, October 3, 98½ pounds per square rod; equal to 7,880 pounds, or 131½ bushels to the half acre.

Statement of John Brooks, Jr.

Carrots.—The eighth acre on which my carrots grew, is wet, with a clay subsoil. The crop of 1857 was carrots, with two and a half loads manure, and twelve and a half pounds

super-phosphate of lime. That of 1858 was ruta-bagas, with two hundred pounds horn shavings. It was ploughed once, May 28, nine inches deep; manured with two loads cow manure, spread before ploughing, raked, and sowed June 6, in rows, with one-eighth pound horn carrot seed; hoed twice and harvested October 24.

Cost of ploughing,	$0 25
Raking,	25
Manure,	2 50
Seed and sowing,	25
Cultivation,	2 00
Harvesting,	1 50
Total,	$6 75

Product October 24, 290 pounds 14 ounces to the square rod.

I consider the horn carrot better and more productive than the orange.

Statement of Isaac B. Woodward.

Carrots.—The lot on which my carrots grew, contains twenty-five and two-thirds rods, is a heavy loam soil, upon a clayey subsoil. The crop of 1857 was southern corn, with seven loads loam that had been put under the cow stable; that of 1858 was carrots, with two cords green manure. It was ploughed the first and last of May, six and ten inches deep; manured with eight loads, spread before ploughing; raked, sowed June 4, with one-half pound orange carrot seed; hoed three times, by hand and once with a wheel-hoe, and harvested the latter part of October.

Cost of ploughing, &c.,	$2 00
Manure,	10 00
Seed and sowing,	50
Cultivation,	4 00
Total,	$16 50

The tops paid for harvesting.

Produce, November 1, 318¾ pounds per square rod.

Statement of W. G. Wyman.

Swedish Turnips. — The eighth acre which produced my ruta-bagas is a gravelly loam upon a loose subsoil. The crop of 1857 was corn and turnips, with three-fourths of a cord of compost; that of 1858, corn and beans, with five-eighths of a cord stable manure from my barn-cellar, and one bushel of ashes.

Eight rods of the lot was ploughed May 2, and twelve rods August 9, each once, about eight inches deep, and smoothed with a hand-rake. The manure was one-third cord, spread before ploughing, and one hundred pounds bone manure in the drill. The first part was sowed June 7, in drills about three feet apart; the second part was transplanted from the first, August 11th and 12th, after a crop of peas, in drills two feet apart. Seed, Rivers' stubble Swedish turnip, raised by myself. The first part was hoed twice, the second had no cultivation.

Cost of ploughing, &c.,	$0 75
Manure and bone,	3 00
Seed sowing and cultivation,	50
Transplanting,	1 00
Total,	$5 25

The tops paid for harvesting.

Produce, November 1, 250 pounds per square rod.

The part which was not transplanted, produced 361 pounds per square rod of large, well-formed roots, while that where the turnips were transplanted produced only 139 pounds per rod, and many of the turnips were small and imperfectly formed.

I think the fact that the weather was excessively dry when turnips were transplanted, and for some time succeeding, and also that the month of October, in which I usually get the best growth of late roots, was very unfavorable for such growth, rendered the experiment in transplanting less successful than it otherwise would have been.

Two small lots transplanted in other places, from ten to twenty days earlier, produced at nearly the same rate as the lot sown, from which all the plants for transplanting were obtained, and the turnips were of a superior quality.

HAMPDEN.

Statement of H. J. Chapin.

MANGOLD WURZEL.—The mangold wurzels which I offer for premium, were grown upon one-fourth of an acre of land which a few years since was almost worthless, being too low and wet for the purposes of general cultivation. The ground was nearly all trenched with the spade, and raised some three feet by filling in the bottom of the trenches with sand; the surface was then covered with sand to the depth of about two inches, and the land ploughed late in autumn into ridges, that the winter frosts and winds might expel the acid common to low and wet soils. Since that time it has been cultivated as a vegetable garden. Prior to ploughing the ground last spring, a quantity of manure from the piggery was evenly spread over the surface, and the land then ploughed. The surface of the ground was then rendered smooth by the use of the hoe and hand-rake. The drills were marked by a horse marker, thirty inches apart, and the seed sown by hand. In August, when the lower leaves began to show symptoms of decay, some half a dozen leaves, more or less, were taken from each plant, by gently pressing down with a brisk motion, leaving all the vigorous leaves to grow. About three weeks later a second stripping took place, and six loads with a one horse lumber wagon, with six-inch side boards, was the result—the leaves were fed to the stock—it required a little more than two hours for a lad, nearly man grown, to fill the wagon.

I would here remark that soils having more sand in their composition, and at a higher elevation from water, make much smaller leaves in proportion to the size of the roots; on such lands the stripping would not pay for the labor expended. The crop was harvested in the middle of October, by pulling six drills and placing them in a row, the tops all one way, for the better dispatch in topping.

We estimated the product by filling a cart eleven times as evenly as possible, and then having one load weighed upon the scales, which averaged thirteen hundred and ninety pounds to the load, making the whole amount fifteen thousand two hundred and ninety pounds.

Value of 15,290 pounds at $8 per ton,		$61 16
Manure and application,	$10 00	
Ploughing,	63	
Preparing land and sowing seed,	2 50	
Thinning,	1 00	
Hoeing four times,	4 00	
Harvesting,	2 93	
Interest and taxes,	4 06	
Deduct expenses,		25 06
Net Profit,		$36 10

Springfield, October 12, 1859.

Statement of Joseph A. Smith.

Carrots.—The carrot crop which I offer for premium, was raised on one-fourth of an acre of ground. The land is of a loamy nature, on which, last season, I raised a crop of parsnips. In preparing for the present crop, I spread on two cords of good stable manure, and turned it under to the depth of ten inches. I sowed about the middle of May, the long orange carrots in drills fifteen inches apart; these were thinned from eight to ten inches in the drill. On the 29th of October I harvested two hundred and ten bushels, weighing fifty-five pounds to the bushel. In harvesting the crop, the plough was passed near the rows to the depth of twelve inches, easily pulling with the hand.

Value of 210 bushels, at 37½ cents per bushels, or $14 per ton,		$80 50
Ploughing and preparing ground,	$2 00	
Seed and sowing,	1 50	
Hoeing and weeding,	6 00	
Harvesting,	4 00	
One-half manure expended,	4 00	
Hauling and spreading the same,	1 00	
Taxes and interest on land,	4 00	
		22 50
Net profit,		$58 00

West Springfield, October 31, 1859.

Statement of H. E. Moseley.

CARROTS.—The crop of carrots which I present for your consideration, was raised on seventy-two rods of ground. When harvested they measured two hundred and seventy bushels of fifty pounds each, or six and three-quarters tons. About one-half of this ground had been sown to carrots two previous years, and was subsoiled in 1858 to the depth of sixteen inches; the other half was a light, warm sod, having been fed one year succeeding a crop of corn and rye. The carrots upon the part that had been subsoiled, were nearly twice the length of those grown on the other half. They were sown in rows eighteen inches apart, about the twentieth of May, and the account figures up as follows:—

Value of 270 bushels of 50 pounds each, 13,500 pounds, \$14 per ton,		\$94 50
Tops worth,		3 00
		\$97 50
Ploughing and fitting land,	\$1 50	
Twelve loads of manure,	12 00	
One hundred pounds of guano,	3 00	
Seed, and sowing same,	2 00	
Hoeing and weeding,	7 50	
After-hoeing,	2 00	
Harvesting,	7 00	
Interest and taxes,	2 00	
		37 00
Net Profits,		\$60 50

SPRINGFIELD, November 9, 1859.

Statement of Dr. L. Long.

POTATOES.—The crop of potatoes which I offer for premium was grown on one-half of an acre of ground, and consists of four varieties selected from the best I could get, to test the quality and productiveness of each. The ground was in turf, and ploughed the second week in May, eight inches deep with the double plough; thoroughly dragged and furrowed, three feet

between the rows; compost manure scattered continuous the whole length of the rows; and the potatoes cut with about three eyes in a piece, and planted fourteen inches apart. The varieties were Jenny Linds, Davis Seedlings, Lyman Seedlings, and St. Helenas. I designed to treat the varieties precisely alike; they were hoed twice, kept clean from weeds, and harvested the second week in October, yielding one hundred and forty-eight bushels and one-fifth, at sixty pounds to the bushel. The order of productiveness is as follows:—Lyman Seedlings, about three hundred and ten bushels to the acre; Jenny Linds, at the rate of three hundred bushels; St. Helenas, at the rate of two hundred and ninety bushels; Davis Seedlings, at the rate of two hundred bushels.

Value of 148 bushels, present price 50 cents, . .		$74 00
Interest on land, ...	$3 00	
Taxes, ...	50	
Manure, two cords, ...	6 00	
Ploughing, ...	75	
Planting and hoeing, ...	3 00	
Harvesting, ...	3 00	
		16 25
Net Profit, ...		$57 75

Holyoke, October 17, 1859.

Statement of H. M. Sessions.

Potatoes.—The field of potatoes which I offer for premium contains one and one-fourth acres. The lot had been used for a pasture for about thirty years; a part of it was underdrained in the spring, but most of it consists of a dry, mellow loam. The stones were cleared off and laid into a wall. Twenty loads of manure, consisting of the scrapings of yards, old plastering, leached ashes, chip dirt, &c., were ploughed in the first week in June. Planted the same week in rows three feet apart; hills eighteen inches apart; potatoes cut in small pieces; ashes and plaster applied in the hill; hoed twice. Harvested two hundred and twenty-four bushels in all. The Early Carters and Peach Blows rotted a very little; Jenny Linds none at all.

Value of 30 bushels of Dovers and Early Carters at 60 cents,		$18 00
Value of 40 bushels Peach Blows, at 50 cents,		20 00
Value of 140 bushels Jenny Linds, at 45 cents,		63 00
Value of 14 bushels small potatoes,		3 50
		$104 50
Ploughing and harrowing,	$5 00	
Planting,	4 50	
Hoeing,	6 00	
Seed,	3 00	
Harvesting,	8 00	
20 loads manure, one-half cord each, half its value,	10 00	
Interest on land,	6 00	
		42 50
Net profit,		$62 00

South Wilbraham, October 12, 1859.

BRISTOL.

Statement of Elbridge G. Dean.

Ruta-Baga.—The quantity of land was forty-two and a half rods. In 1858, one-half was planted to turnips, the remainder to potatoes. I applied about two cords of compost manure. A quarter of a pound of seed was used in planting. Ploughed in May, 1859, about ten inches deep. In June harrowed and bushed, and furrowed about two feet apart. The 12th of June sowed the seed in rows about two inches apart.

Wed and thinned about the middle of July. The crop was harvested on the 25th and 31st of October. Weighed 7,880 pounds, equal to 131⅓ bushels of sixty pounds to the bushel.

EXPENSE OF CROP.

Ploughing, drawing manure and planting,	$2 50
2 cords of manure,	8 00
Weeding the second time,	1 00

Weeding and thinning,	$3 00	
Harvesting,	1 50	
Quarter of a pound of seed,	16	
		$16 16
Value of 131⅓ bushels,		52 50
Net Profit,		$36 34

TAUNTON, December, 1859.

Statement of Lysander R. Hall.

MANGOLD WURZEL.—The land on which I raised this crop is a low, sandy loam. Last year it produced about fifty bushels potatoes to the acre, and at that time was manured only in the hill. I ploughed the piece in May of this year, about twelve inches deep, using a double plough. Used eight cart loads of horse manure, and seventy-five pounds of guano. The seed was sowed May 4th and 5th in drills about eighteen inches apart. After ploughing, I furrowed about ten inches deep, then spread the manure along the furrows and covered with dirt, then sifted the guano over this and covered again with soil and sowed the seed by machine. I hoed the piece both in June and July, and harvested the 7th and 8th of November, and after cutting off the tops weighed the crop, which, allowing sixty pounds to the bushel, amounted to 265 bushels at 25 cents per bushel, gives $66.25, as the value of produce from the forty rods of land.

EXPENSE.

Ploughing,	$1 00
8 loads of manure,	8 00
75 pounds of guano,	2 25
Spreading manure along the drills,	60
Sowing seed,	25
Weeding and hoeing,	3 50
Harvesting,	3 00
1 pound seed,	50
	$19 10
Profit,	47 15
Value of crop,	$66 25

RAYNHAM, December, 1859.

Statement of Lysander R. Hall.

French Turnips.—The land on which I raised this crop is a low, sandy loam. Last year it produced about forty bushels of potatoes to the acre, and at that time was manured in the hill. I ploughed the piece in June of this year, about ten inches deep, used six cart loads of barnyard manure, and three barrels of wood ashes. The seed was sowed June 13, in drills about fourteen inches apart. After ploughing, I furrowed about nine inches deep, then spread the manure and ashes along the drills and covered with dirt. Sowed the seed by machine, and hoed the piece twice, and harvested the 4th and 5th of November. The crop weighed 13,500 pounds, which, allowing sixty pounds to the bushel, amounted to 225 bushels, which, at 35 cents per bushel, gives $78.75, as the value o produce from forty rods of land.

EXPENSE.

Ploughing,	$1 00
6 loads of manure,	6 00
3 bushels ashes,	1 00
Spreading the manure and sowing seed,	93
Weeding and hoeing,	3 50
Harvesting,	4 00
Seed,	12
	$16 55
Profit,	62 20

Raynham, December, 1859.

Statement of Alson Gilmore.

Potatoes.—The land, one acre, on which I raised my potatoes, was planted last year, part to turnips, and part to potatoes, and had a very fair crop. Put on ten cart loads of manure in 1858. Soil sandy loam. The last of April and first of May, 1859, ploughed the land about eight inches deep, and put on twelve cart loads of manure, furrowed the ground and dropped the manure in the furrows, about three and a half feet apart each way. Planted about three-quarters of the ground April 25th and 26th, and May 3d and 4th. The other quarter was

planted the 27th day of May. The seed potatoes were small, part of them were halved, and two pieces or two potatoes were dropped in each hill. Hoed on the 18th and last of June, The seed potatoes used were Davis Seedlings and Jenny Linds. The crop was harvested in October, weighing 12,670 pounds, or 211⅙ bushels.

The value of the crop was, for		
161 bushels Davis Seedlings, at 60 cents,		$96 60
27⅙ bushels Jenny Linds, at 60 cents,		16 30
23 bushels small, at 25 cents,		5 75
		$118 65
The expense of cultivation was, for		
Ploughing and furrowing,	$2 50	
Planting,	6 00	
Hoeing,	5 00	
9 bushels small potatoes,	3 00	
Harvesting,	8 00	
12 loads manure,	12 00	
Interest on land,	3 00	
		39 50
		$79 15

Easton, November, 1859.

FARM IMPLEMENTS.

ESSEX.

From the Report of the Committee.

The improvements in Ketchum's and Manny's mowing machines ought to entitle them to more than a passing notice. Much has already been done towards perfecting them, but something still remains to be done to make them perfect machines.

Machinery for the cultivation of the soil is of the greatest importance to the farmer, as by its use he converts his horse or his ox into obedient servants, who when well fed, never refuse

to labor, be it early or late, or strike for higher wages when labor is scarce.

There is, we regret to say, one great drawback to the general introduction of farm machines; we mean their cost. The price of many of the patented articles is so high as almost to exclude the use of them to owners of small farms; the price of the corn-sheller exhibited to-day is $15. With this machine a child six years old could shell, by way of amusement, all the corn consumed by any farmer in the county of Essex in a year. It is a very simple machine, and ought to be sold for not more than two-thirds its present price. So of the horse-hoeing machine exhibited by Mr. Ware, a most useful labor-saving machine, and one which would be worthy the attention of every farmer, provided the manufacturer would offer it at a reasonable price.

E. S. Williams, *Chairman.*

WORCESTER.

From the Report of the Committee.

Among the prominent machines exhibited is Bolles' Patent Rock and Stump Puller, manufactured by Nourse, Mason & Co. Your Committee had the pleasure of witnessing its operation, upon the farm of John Hammond, Esq., near the society's grounds, and were much interested in the exhibition of its power, and the ease with which it lifted large rocks from out of the ground; and they are fully of opinion that it is decidedly one of the improvements of the age, and cheerfully recommend it to farmers and others, as a powerful assistant in the work for which it is designed. They also exhibit a Stump Puller, Kinney's patent, which, though simple in its operation, is a powerful machine.

William A. Wheeler, *Chairman.*

HAMPSHIRE, FRANKLIN AND HAMPDEN.

From the Report of the Committee.

William R. Clapp, of Northampton, showed three sizes of Rotary Harrows, which the farmers will do well to examine. The testimony of those who had used the harrow, convinced the committee that they are a very decided improvement in

that important implement of farm husbandry. Of all the "harrowing spectacles" which the committee saw, the Rotary Harrow made the deepest impression and will be the longest remembered. He also exhibited a press which he entered as a "Scrap Press," but is capable of being used for a variety of purposes, in the pressing of fruits and other substances which nearly every family has occasion for during the year. It is well worthy of their attention.

Four different mowing machines were presented for examination:—the Buckeye, the Allen, Wood & Little's Mower, and Manny's Improved. According to the rules of the society, neither of them could be entered for premium. Each machine has its friends, who are decided in their preferences, and doubtless, each one has its points of excellence, and, it may be, its defects. But the committee had no opportunity of seeing them operate in any place to test their merits or show their defects. The committee spent considerable time in examining them all and listening to the statements of those who had them on exhibition. But without a practical test, an opinion, based as it must be, upon what they saw of them in the hall, would be worth but little to the farmers, who are the class most deeply interested in their success. The mechanical construction of the Buckeye machine seemed to the committee to admit of its adapting itself readily to an uneven surface, which on many farms is a feature of great importance, and no machine can fully meet the wants of our farmers that does not possess it. It is also claimed by the friends of the Allen machine that this feature is one of its great merits. A good one-horse mower combining the requisites of lightness of construction and easy draft, and one that will perform good work on our small New England farms, is a desideratum. There was a one-horse machine exhibited, but whether it possessed the qualities necessary as enumerated above, the committee had no means of correctly judging without a trial. If such an one has not already been invented, we hope the day is not far distant when one will be; and we can predict for the fortunate genius who accomplishes the task the blessings of many weary ones, who, during the haying season, are "ready to perish."

CHARLES B. JOHNSON, *Chairman.*

NEAT STOCK.

WORCESTER NORTH.

Report of the Committee on the Winter Management of Stock.

Five gentlemen have favored the committee appointed for that purpose with an invitation to examine their management, viz.: Messrs. John Brooks, Jr., of Princeton, George Chandler, of Shirley, Jabez Fisher, James P. Putman and Benjamin Safford, of Fitchburg. We have called upon other farmers as we have been in their neighborhood, who kindly received us and showed us their stock, giving us much information in relation to it. The object of this offer of premiums seems to direct our inquiries to the manner of expending the crops of the season, and to the returns received; the number and condition of the stock, quantity of manure, the way of keeping and using it, amount of sales, &c. So far as your committee know, this is something new and well worthy careful attention.

January 26. We first visited, by request, the establishment of John Brooks, Jr., of Princeton. His stock consists of thirty head of neat cattle, viz.: thirteen cows, four two-year-old heifers, three one-year-old do., and five calves; two Devon and two Ayrshire bulls, and two yoke of oxen; ten of the cows are Ayrshires and three Devons. He has four horses, two colts, and two hogs. The weight of hay consumed daily by his neat stock, of all ages, averages twenty-two pounds per head. The estimated weight of his crop of hay is sixty-six tons. Feeds five times a day, viz.: at six and seven, A. M., and at three, five, and nine, P. M.; the last time with coarse feed, such as straw and corn fodder. The cattle are let out in the middle of the day and have free access to water in the yard. He considers hay worth eight dollars per ton for feeding out to stock; gives roots daily to milch cows and calves; thinks turnips worth as much as carrots for that purpose, and if given immediately after milking they give no taste to the milk. He gives corn and cob meal to cows after calving, has used cotton seed meal to a limited extent, and thinks well of it. The hay-mow is cut down with the hay-knife, and a root-cutter rapidly reduces

the large roots to dimensions suited to the caliber of the throat of the animal. The cribs and barn floors are daily swept out and kept clean. The droppings from the cattle without litter are let into the barn cellar directly under them, and kept *a year* before being used. The cow-yard is roofed over, ridge-poles extending across twelve or fourteen feet apart, the roofs meeting at an angle and forming troughs, which carry off the water. Muck is spread four or five inches deep over the yard and mixed with the droppings of the cattle. The horse manure is carted out early, before fermentation commences, and laid in small heaps ready for spreading. He raised last season two and one-half acres of barley, two and one-half of oats, one of corn, three of potatoes, and one of turnips. The roots are stored in the barn cellar. Corn is put into racks four feet wide, ten feet long, and six or seven high, made of slats, the bottom six or eight inches from the floor, with spaces between the slats to admit air, and passage-ways between the racks. It will be noticed that his neat stock is all blood stock, more or less pure; the cows mostly Ayrshire. By the kind attentions of Mr. Brooks, we visited with him a number of herds of cattle in Princeton. At the Boylston place we saw forty-three cows in one stable, the stock of Mr. Davis. Mr. W. W. Watson showed us some very fine Durham stock. Mr. Henry Boyles exhibited nine very handsome yearling heifers of mixed blood, and some very good cows. At Maj. Reed's we saw some very good stock. After returning to Mr. Brooks' and partaking of the hospitalities of his house, we went again to the barn to see the "tieing up" and the three o'clock feeding; and then set our faces toward home, being well pleased with what we had seen, and wondering how it happened that any one of the committee did not stick to farming.

January 31. We examined into the management of Mr. George Chandler, of Shirley. Mr. Chandler's profit arises from taking horses and neat stock to keep. He has reduced that business to a system. He is keeping this winter thirty-three horses and three colts, and seventeen head of neat cattle. He feeds both cattle and horses three times a day, viz.: at six, A. M., at noon, and just before dark, and waters twice. At noon each horse has poured upon his hay two quarts of corn and cob meal made into dough. Mr. Chandler says he will keep a

horse fifteen weeks on a ton of hay, with two quarts of corn and cob meal per day, in good condition, *provided he does no work.* Mr. Chandler takes a colt as soon as it is weaned, keeps it until it is four years old for one hundred dollars. He takes a heifer calf a day old and keeps it until it has its first calf, both of which are then returned, and he gets thirty dollars. When the heifer is returned at two years old, with its calf, he gets good pay; if he has to keep her another year, it is rather poor. The barn is seventy feet by thirty. Temporary stalls are put up to accommodate new boarders, and none are turned away. The manure is shovelled into the barn cellar, where it is spread about and two hogs work upon it. In the spring it is carted out and mixed with an equal quantity of loam, laid in a mass two and a half or three feet deep, worked over with a plough twice, and, after haying, a part of it is spread upon his mowing, twenty loads (five cords) to the acre, or if used for corn, as a part of it is, it is at the rate of sixty loads to the acre. When he plants corn he manures high, and lays down to grass the next year, without manure; his object being to raise hay.

We had the pleasure of calling upon Col. Whitney, of Shirley, who very politely showed us his stock of milch cows, fifteen in number, and informed us about his "management." He feeds six times a day, twice in the morning, twice at noon, and twice at night, and gives oil meal once a day made into swill with water. He lets his clover stand until well ripened, and feeds it to his cows. He is getting at this time thirteen cans of milk per day, from his fifteen cows, which he keeps in the stable all the time in winter, only letting them out to water.

Mr. Nathan Holden, of Shirley, has eight cows now in milk which yield eight cans of milk per day. He feeds out, besides hay, one quart of oil meal in swill, and one quart of corn and cob meal per day to each cow. The barn is fifty-eight feet by thirty-eight. His cows are grade Alderney, Durham and Native. Loam is drawn to the barn in the fall, and in the winter is spread for litter in the cow stable, designing to have as much loam as there may be of the droppings of the cattle. The whole is shovelled into the cellar, which is capacious; when there is much of a pile it is worked over and thrown back into a heap, and carried to the field by sledding in the last of winter.

February 4. We called upon Hon. Jabez Fisher, of Fitchburg; he being absent, his stock and management were made known to us by his intelligent overseer. His stock consists of three cows, one yearling heifer, one calf, one cosset, one pair of mules, and one horse. One of the cows is Native, with a trace of Durham; the rest are grade Durham and Ayrshire. He feeds corn stalks or butts in the morning, and cuts no feed this year, thinking that cutting does not pay. The second feeding in the morning, at seven or eight o'clock, is with hay; third feeding, with hay, at noon; hay again at milking time, afterwards corn fodder. He gives a cow a peck of carrots per day, and no meal until about calving time; then gives corn and cob and bean meal, three bushels of ears of corn and one of beans ground together, two quarts a day to a cow, in warm water. Cows and hens eat bean meal readily; horses, mules, and hogs will not. His bean and pea straw is well saved and fed to cows, and is readily eaten. The two mules take, besides hay, three quarts corn and cob meal together per day, no more. He has five hogs, one of them a Suffolk boar, and feeds them with swill night and morning, and with ears of corn at noon. He also keeps eighty hens, and gives them a pailful of bean, corn and cob meal, and four quarts of corn daily. The barn cellar is made water-tight, and receives the droppings from the stalls, solid and liquid; water is pumped in, and the manure is applied in a liquid state, carted out in a sort of cask with wheels attached, and used by means of a flexible tube.

We next called upon Mr. B. Safford, of Fitchburg. His stock consists of three cows, two milch heifers coming three years old, two heifers two years coming, not yet in milk, two cossets, hens and turkeys. He feeds five times a day, viz.: twice in the morning, once at noon, and twice at night; first in the morning, with corn fodder; second, with hay; then corn fodder at noon, and corn fodder first at night, and hay last. He gives no grain in winter. He is now getting from two cows one can of milk a day. His cows are let out during the forenoon in pleasant weather, when cold are kept in. His way of curing his clover is to mow it in the morning after the dew has dried off, let it lie in the swarth until three or four o'clock, P. M., turns it, on the next day before noon pitches it into cocks and puts on the caps; after two or three days turns the

cocks bottom upwards, and after a day or two more carts in and mows away, with a little salt. He salts all his hay when he puts it in the barn and cuts his corn butts, for nothing except for the horse when worked. Cows readily eat corn stalks that are black and mouldy, when they will reject those that are well dried, fresh and bright.

The same day we called upon Mr. James P. Putnam, of Fitchburg. He has twenty head of neat stock; six are cows, and fourteen are young cattle, five horses and three hogs. He feeds six times a day; three times in the morning, and three times at night. He formerly gave his work horses cut feed; now gives them dry hay and dry corn and cob meal, two quarts only of the meal to a horse morning and night, and a peck of carrots at noon, and thinks they do as well. Barley straw and hay are mixed for neat cattle, and they eat it well. The horse dung goes into the cellar, where the hogs lie upon it and work it over. The droppings from the neat stock fall into the cellar, which is open to the south the length of the barn; the bottom is covered in the fall with loam five or six inches deep; this, with the litter of the barn, is worked over with the manure, and in the spring carried to the field for use. High in the barn, six or eight feet below the ridge-pole, a floor of slats four or five inches wide is laid, with spaces between to admit air; this is used to set corn stalks upon, after they have remained in the field two days after cutting. The air circulating between the slats dries the stalks without souring. Cattle eat them readily.

Your committee have found many excellent ways in the management of each one of the gentlemen who invited their inspection. Each one has regular and stated times for feeding stock, and a regular system of rotation in the kinds of feed. Nearly all keep their neat stock in the barn, except a short time in the middle of the day in mild weather. Some use their coarse feed, such as straw and corn fodder, in the morning, first feeding; most of them use it at night, for the last. One keeps his stable manure a year before using it; one other, whose fields are near the barn, uses his in a liquid state; the others mix up and use for the crops of the next summer. All of them keep or prefer to keep their manure under cover, with some way to save liquid as well as solid. It is well to know all

these facts, that observations and comparisons may be made by all who desire to adopt the best way.

T. R. Boutelle, *Chairman.*

WORCESTER NORTH.

From the Report on Breeding Stock.

The experience of stock raisers of late years, shows the opinions of those of former times to be erroneous, when they asserted that a cow giving a large flow of milk could have but little flesh. Equally absurd is the doctrine that a bull needs no other recommendation than beauty. We would say with *emphasis*, that it is of as much importance that the bull should spring from a race of good milkers as the heifer. The heifer calf has frequently been sold at a higher price because the dam was superior for milk, but when tested proved altogether of another blood, thus showing conclusively that the stronger has almost, if not altogether, absorbed the weaker. Not so with the bull calf when thrown into the market; he is some dear-bought or far-fetched Ayrshire, Devon or Jersey, and often poor at that. It is not our purpose to discourage the importation of foreign stock, but to encourage the improvement of stock in general. But we cannot now enter into all the minute points on the subject, but hope the time will soon arrive when the relative importance of the animal we speak for will be better understood, and that he may have less to do in sounding his own horn.

Antipas Maynard, *Chairman.*

Statement of John Brooks, Jr., on Feeding Devons and Ayrshires.

Last winter, having some leisure time, I thought I would try some experiments; among them is the following, in feeding neat stock, showing the difference in the expense of keeping Devons and Ayrshires. I find considerable difference, viz.: 100 pounds live weight of Devons eat 2.10 pounds of hay daily; 100 pounds live weight of Ayrshires eat 2.86 pounds of hay daily; .76 pounds, or more than one-third more than the Devons.

The stock I fed were four last season's calves, two Ayrshires and two Devons, one year old this spring, very near the same age, and were fed alike in every particular. They were fed two different times, ten days at each time. I weighed the cattle every day, also the hay that they consumed.

The Devons gained in flesh the first ten days, 34 pounds.						
The Ayrshires	"	"	"	"	20	"
The Devons	"	"	second	"	29	"
The Ayrshires	"	"	"	"	20	"

The Devons look the best, plump and in better flesh than the Ayrshires.

I think that in new England, where we have poor pastures and get our hay by the sweat of our brow, we had better turn our attention to raising Devons in preference to any other stock. The cows will make as much butter as the Ayrshires, but do not give so much milk, about one-fourth less. For oxen they cannot be beat—quick and easy to be taught. The difference, then, is in the one-fourth more skim milk that you get from the Ayrshires to pay the one-third more that it costs to keep them.

NORFOLK.

CATTLE BREEDING IN NORFOLK COUNTY.

BY SANFORD HOWARD.

In accordance with the request of the officers of the Norfolk Agricultural Society, I herewith submit a few suggestions in regard to cattle breeding in this county.

The question may be raised in the outset, whether it is expedient to breed any description of cattle here. It may be urged that the comparatively high price of our lands and their general inferiority for grazing purposes, render the breeding and rearing of stock unprofitable. Admitting the soundness of these objections, in the main, there may still be an advantage in rearing a particular kind of stock, or at least it may be shown that one kind may be reared to better advantage than another.

Our proximity to a large city, and the existence here of a large manufacturing population, cause a large demand for the products of the dairy, particularly for milk, which cannot be brought from so remote localities as beef. We may reasonably expect this demand to continue, and that prices will be so far remunerative that the article will be largely produced in this county. Cows, therefore, must be the principal stock of our farmers, and the means of obtaining those which will afford the greatest profit for their cost and food consumed, is the question for consideration.

Every one knows the difficulty of obtaining good milch cows in the ordinary cattle markets. They are indeed so rare that the greater portion are retained by the breeders themselves, and the fact of a cow in the prime of life being sent to market is generally regarded as *prima facie* evidence that "there is something wrong about her," either in natural propensities or acquired habits. If untried heifers are bought from droves that are gathered promiscuously, the chance of their making good cows is small, though something may be gained in the preliminary training they may receive. It should be remembered that the general purchaser cannot resort to herds of reputation as dairy stock, because but few such are established. He must run the risk of taking animals from the miscellaneous stock of the country, which as a whole, has no fixed or distinguishing characteristic.

The advantages in favor of cows reared here, are, that they are generally more healthy than those brought from a different locality; that they may be so trained as to become gentle and free from tricks; and that by selecting from a stock known to be good, the chances of obtaining the desired qualities are greatly increased. Oxen can be obtained with less difficulty than cows; there is less liability of deception; a brief trial in the yoke settles the question of their fitness for the purpose in view.

The inference from these premises is, that dairy stock is the kind the breeding and rearing of which would be most advantageous in this county. It has been a favorite idea, I am aware, that cattle should be bred with reference to combining all qualities—beef, ability to labor, and milk. Without occupying space in the discussion of this point, it may be said that it is not gen-

erally the most advantageous course. It must be evident that a higher degree of excellence is attainable in reference to any particular property, when the attention of the breeder is specially directed to that property, than when the attempt is made to combine in the same animal properties more or less antagonistic. Why, then, should not every breeder have regard to the main object for which he keeps cattle? If milk is the object, let him keep the breed which will give the best return in that article, and when he wants cattle for different purposes, let him obtain them from other breeders, who, being differently situated, find their profit in attention to other properties.

Of the various breeds of cattle which are particularly adapted to dairy purposes, it is impossible to say which would be the most successful here. None of them have been tried to an extent that would justify a positive assertion in regard to them. The most, therefore, that will be attempted in this connection, is to notice those breeds or crosses which it seems most probable would give satisfactory returns, leaving to actual and thorough trial, the final settlement of the question. Before disposing of this point, however, it may be well to remark, that cows of medium or rather small size, will be found, generally, to give the best returns from our pastures. It is a principle well established in England, where the breeding of cattle and their adaptation to special localities and purposes is better understood than in any other part of the world, that the size of the animal should depend on the soil and climate. Our soil is rather poor and our climate severe, and hence an animal of only medium size, or less, is best suited to our circumstances. On a poor pasture, a large animal may only be able to obtain food enough to supply the natural waste of the system; but a smaller animal, requiring proportionably less to supply this waste, might lay by a surplus in the shape of fat or milk. Hence, although there may be a large range, a sheep will fatten where a cow will starve, and a small cow will keep in good order, and give milk, where a large one can only hold her own, or perhaps grow poor.

Our cattle, as well as other domestic animals, have come mostly from the British Islands, and owing to the general superiority of the stock of those islands, it is probable that

we shall, in most cases, resort there for whatever new blood it may be thought proper to introduce into this country. The British breeds which are included in the milk-producing class, are the Ayrshire, the Alderney or Jersey, the Yorkshire, the Leicestershire, or Longhorn, the Suffolk and the Kerry.

The Ayrshire breed may be said to be of artificial origin. It appears to have been first known as the Dunlop breed, from the superior stock in the possession of General Dunlop, near Ayr, seventy-five or eighty years ago. It is said that this gentleman imported cattle from Holland, the blood of which was infused with other breeds, (one of which was probably the Alderney,) thus forming the foundation of the modern Ayrshire. There is evidence that the Dunlop family were in possession of valuable dairy stock as early as the period above alluded to. The poet Burns, when he was farming at Ellisland, near Dumfries, in a letter written in 1788, speaks of a heifer which had been presented to him by the proprietor of Dunlop House, as "the finest quey in Ayrshire." But there is little doubt that the present leading type of the Ayrshire was derived in part from a cross with the Kyloe or West Highland breed. This appeared, in the first instance, probably, in what was called the Swinley variety. The facts which I have obtained in Scotland in regard to it, are substantially as follows: Theophilus Parton, of Swinley farm, near Dalry, Ayrshire, about forty years ago, took great pains to select a herd of what were deemed to be the best Ayrshire cattle, into which he infused a strain of the West Highland blood, the particular degree of which is not generally known.* The Swinley stock differs from the ordinary Ayrshire in having a shorter head, with more breadth across the eyes, more upright and spreading horns, more hair, and generally better constitutions. They are also somewhat smaller boned than the old stock, though from their superior symmetry they are equal to them in weight of carcass.

The following points given by the Ayrshire Agricultural Association, 1853, "as indicating superior quality," will give

* In my late visits to Scotland, I learned that Mr. Parton was still living, though from the infirmities of age, upwards of eighty years, he does not attend to business matters.

an idea of the standard for Ayrshires, as recognized by the leading breeders:—

Head short, forehead wide, nose fine between the muzzle and eyes; muzzle moderately large, eyes full and lively, horns widely set on, inclining upwards and curving slightly inwards.

Neck long and straight from the head to the top of the shoulder, free from loose skin on the under side, fine at its junction with the head, and the muscles symmetrically enlarging towards the shoulders.

Shoulders thin at the top, brisket light, the whole fore-quarters thin in front, and gradually increasing in depth and width backwards.

Back short and straight, spine well defined, especially at the shoulders, short ribs arched, the body deep at the flanks, and the milk-veins well developed.

Pelvis long, broad and straight, hook [or hip] bones wide apart, and not much overlaid with fat, thighs deep and broad, tail long and slender, and set on level with the back.

Milk-vessel [udder] capacious and extending well forward, hinder-part broad and firmly attached to the body, the sole or under surface nearly level. The teats from two to two and a half inches in length, equal in thickness, and hanging perpendicularly; their distance apart at the sides should be equal to about one-third of the length of the vessel, and across to about one-half of the breadth.

Legs short, the bones fine, and the joints firm.

Skin soft and elastic, and covered with soft, close and woolly hair.

The colors preferred are brown, or brown and white, the colors being distinctly defined.

Weight of the animal when fattened, about forty imperial stones, sinking the offal [that is 560 pounds, the quarters, or meat only.]

As to the produce of the Ayrshire breed, Professor Low says: "Healthy cows, on good pastures, give from 800 to 900 gallons of milk a year." Aiton says: "600 gallons a year may be deemed about the average of this breed;" and the author of *British Husbandry*, says, in reference to this yield: "If equalled, we believe it will not be found exceeded by any other breed in the kingdom." Martin says: "The milk of the Ayrshire cow

will afford 250 lbs. of butter, or 500 lbs. of cheese, annually." Milburn's estimate is that cows of this breed will give 600 to 800 gallons of milk in the course of the year, and as much as 260 lbs. of butter. Haxton cites many statistics, from which it appears that in one dairy of thirty cows, the average annual yield of milk was 632 gallons; that 9¼ quarts afforded a pound of butter, amounting to an aggregate of nearly 274 lbs. in a year.

This breed has not, as yet, had a fair trial in this country. A few have been imported from time to time within the last twenty years, and the Massachusetts Society for Promoting Agriculture imported several from 1839 to 1844. For the same society I selected and shipped eleven heifers and four bulls, in 1859, all of which arrived safely in this country. I also sent with them eight head of the same breed, for different gentlemen in this State. In 1859 I selected and shipped to H. H. Peters, Esq., of Southborough, twenty-three head of Ayrshires, which, with those obtained for him the previous year and their descendants, make the number of his herd thirty at this time.

Most of those of the importation of 1858 and 1859 are young, but few of them having bred at the time they were imported. Hence it will require several years to determine their actual character in regard to what they are capable of doing here.

The Jersey or Alderney breed takes its name from a group of Islands (Jersey, Alderney and Guernsey,) in the English Channel, and is hence sometimes called the Channel Islands breed. These cattle are supposed to have come originally from the French coast, and they certainly bear considerable resemblance to those of Normandy. Indeed, they were formerly called the "Alderney or Normandy breed." The writer has seen men who had been engaged in selecting cows in Normandy which were sold in England as of the Guernsey breed. The Channel Islands cows are distinguished for the richness of their milk and the superior quality of the butter it affords. The quantity of butter is also large in proportion to the size of the cow. The old stock of all the Islands was delicate in constitution, and the shape of many of them was ragged and uncouth —as Col. Le Couteur says, in his essay on the Jersey cow,

published in the Journal of the Royal Agricultural Society, they were "Meg Merrilies of cows."

The Alderneys were introduced here upwards of thirty years ago, and were at one time quite common at the country seats of gentlemen around Boston; but they generally failed for want of hardiness. The improved Jersey is claimed to be superior to the Alderney and Guernsey. A society which was established for the improvement of these cattle has existed in Jersey for many years. According to Le Couteur, the shape and constitution of the breed have been much improved by proper selections through many generations, while something has been gained in the quantity of butter in proportion to the food consumed. This improved stock has been considerably introduced into this country, particularly into this State and Connecticut; but a sufficient time has not elapsed since their introduction to justify a positive opinion in regard to their success here. They are evidently more hardy than the old Alderney stock; their hides are generally thicker, though frequently too thin; they have better forms, and their fattening tendency is increased, though not generally to a degree that interferes injuriously with the yield of milk. So far as an opinion can be formed from what they have done here, they seem to be just the cows for the town and city, where plenty of good food and comfortable shelter are always provided. As to general dairy purposes in the country, it would be well to give them a fair trial, having particular regard to selections of those of good constitution. They are also worthy of attention for crossing the common stock. Persons who have kept the breed in the vicinity of Boston, have obtained an extra price for butter. Instances are not uncommon, of cows of this breed affording ten to twelve pounds of butter a week, and sometimes still higher yields are obtained. The statement of Thomas Motley, Jr., Esq., of West Roxbury, was published several years since, showing that the milk of his cow Flora produced 511 lbs. of butter in one year.

The Yorkshire breed is a sub-variety of the Short-horn. It is not that which has been denominated the Improved Short-horn, or Durham breed, whose leading characteristic is the production of beef. Though both belong to the Short-horn race, there is as much difference between the milking and fattening

varieties as between cattle which are frequently considered of distinct breeds. The term Yorkshire may be said to comprehend the great bulk of Short-horn cattle having no pedigrees, and those having unknown or indefinite degrees of the improved blood. They have frequently been imported to this country, sometimes as "ship's cows," but are often elevated to the rank of "Durhams" on their arrival. A variety called Holderness, from a district of that name in Yorkshire, was formerly celebrated for milk. The Yorkshires have been kept extensively in England for milk, on rich pastures, and for the milk-dairies of cities. But they are not adapted to short pastures, on account of their great size and rather weak constitutions. They are not a breed that would be profitable here, under ordinary circumstances.

There was formerly a variety of cattle in Yorkshire called the Yorkshire Brindle, much prized for their milking properties. From some of the remnant of this variety that I have seen in England, they may be said to differ considerably from the Short-horns. Their color is widely different, being, as their name indicates, brindled, while the ordinary Yorkshire, as well as Short-horns in general, are either roan, or red and white; the head is generally shorter and broader, with longer and more upright horns. From descriptions of cattle imported into Virginia in the latter part of the last century, and subsequently transferred to Kentucky, it seems probable that some of them were of the Yorkshire brindle breed.

The Leicester or Long-horned breed is one of great antiquity, being generally considered indigenous to Britain and Ireland. It appears to have occupied, originally, the lower and more fertile portions of the country, while the hilly or mountainous districts were possessed by a smaller race, better fitted for scanty fare and exposure. The Long-horn cows of both England and Ireland have always had the reputation of being good milkers, except the variety originated by Bakewell, in which the fattening propensity was cultivated without regard to milk. They are of rather large size, ranking next to the Short-horns in bulk of frame, but do not generally fatten to as great weights as the Herefords. They are not as extensively kept in England and Ireland as formerly, having given way, in the beef-making districts, to breeds of earlier maturity; but in some of the dairy

districts—especially where cheese is the product—they are still retained and highly esteemed, their advocates contending that no breed can surpass them for this object. At the Show of the Royal Agricultural Society at Warwick, in July last, I saw several very fine specimens of this breed. They were generally well shaped, excellent handlers, with indications of being good milkers. This remark would also apply to specimens of the breed seen on various farms in England. They are very hardy, for so large a breed, and make up in longevity what they lack in early maturity.

The Long-horns have formerly been introduced into different sections of this country, but not in large numbers, and there are few instances where the breed has been kept pure. The blood was diffused to some extent in the best grazing portions of Kentucky and Ohio, and the cattle of those sections, although the Short-horn blood generally predominates, still often show, by the fineness of the shoulder and rising neck, the effect of the Long-horn cross. In Maine, the first course in the production of the large and strong oxen for which some parts of that State have been noted, was a cross with Long-horn bulls introduced by Mr. Vaughn, nearly seventy years ago; and in Massachusetts, the same stock obtained considerable notoriety through an animal presented by Mr. Vaughan to Governor Gore, his descendants being called "the Gore breed."

The Suffolk breed is without horns. It was formerly somewhat noted for dairy properties, but is not extensively kept at the present time. It is not absolutely known that any of this breed have ever been imported into this part of the country; but the polled or hornless cattle, which were formerly quite common here, bear more resemblance to the Suffolks than to any other breed. They certainly have no claim to the title of Galloway, which is sometimes applied to them, being different in color, (the Galloways are almost invariably black,) shape and characteristics. Near the close of the last century, Joseph Russell, Esq., of Boston, imported from England several hornless cattle, which the late Colonel Jaques, who was well acquainted with them, believed to be of the Suffolk breed. They were kept in Chelsea, and some of the descendants of the herd are now in the possession of Benjamin Shurtleff, Esq., of North Chelsea. A cow was also brought to this country from

Ireland, several years since, in the ship Jamestown, and hence was called "the Jamestown Cow," which closely resembles the Suffolks I have seen in England. A bull from this cow by a Jersey bull has been kept in Dedham several years, and has left a progeny which in general appear to possess superior dairy properties.

The Kerry breed belongs to the county of that name in Ireland, or more especially to the mountainous portion of that county, where they have probably existed coeval with the present race of human inhabitants. They are very different from the cattle which occupy the lower and more fertile sections of the island—the latter, as has already been observed, belonging to the Long-horn tribe, of large size, the horns drooping, sometimes crossing each other beneath the lower jaw. The Kerries, on the other hand, are small, with horns of medium length, rising, and generally somewhat spreading. The color ranges from black to brindled and red, sometimes with a little white, but black is the prevailing color, and is preferred as denoting the nearest affinity with the original type. The Kerry cow has always been considered remarkable as a milker. Youatt says she is "emphatically the poor man's cow; hardy, living every where, yielding, for her size, abundance of milk of good quality." Milburn says: "she is a treasure to the cottage farmer—so hardy that she will live where other cattle starve. She is a perfect machine for converting the coarsest cattle-food into rich and nutritious milk and butter."

In 1858, and also in 1859, I visited the native country of the Kerry cattle, chiefly for the purpose of learning their characteristics, and purchasing some to send to America. I found the cattle somewhat smaller than I had supposed them to be, but evidently very useful in that locality—living where no other dairy cattle that I have ever seen could live. In several instances they were met with at elevations of fifteen hundred to two thousand feet above the sea, sharing with the goat the wild herbage of the mountain's side. As illustrating their hardiness, the following incident is given: A man led me up a mountain glen to see a lot of three-year-old heifers he had grazing there. It appeared a mystery to me how the cattle could get round and over the rough rocks, and obtain a subsistence, even in summer. Having noticed that the man had several

stacks of hay down in the valley, where was the rude habitation which he called his home, I asked him if he was going to take the Kerry cattle there for the winter. He replied, "No, the hay is for the lowland cattle and ponies." He had just been telling of the deep snows which sometimes fall in the mountains, and I asked what the cattle would do in such cases. He said, "The snow generally softens after a day or two, and the cattle can *work through it*."

It is difficult to estimate the weight of these cattle, compared with others, from what I have seen of them. They are generally large-bodied in proportion to their height, their legs being short, and the shank-bones very small. Their heads are generally handsome, and the countenance lively, but with a mild expression. The best of them are decidedly attractive in their appearance. When taken to the low country and supplied with plenty of nutritious food, they become more bulky, but I had no opportunity to see what would be the effect of breeding them for several generations in a milder climate and on a better soil.

I could not generally obtain reliable statements in regard to the yield of milk or butter of these cows. In several instances where they were kept, in the low country, it was stated that they would give, per day, ten imperial quarts of milk, which would afford a pound of butter—certainly a large product, considering the size of the animal. It is stated that Mr. Crosby, of Ardfert Abbey, near Tralee, obtained in his herd, ranging for seven years in succession from twenty-eight to eighty cows, mostly Kerries, an average of 1,952 quarts of milk in a year, which yielded a pound of butter to eight quarts—or 244 pounds per cow annually, and that one pure Kerry cow in the herd gave 2,725 quarts of milk in ten months.

I purchased for Arthur W. Austin, Esq., five two-year-old Kerry heifers, and a bull of the same breed, which arrived here after a very long and boisterous passage, in November last. The bull, however, was so much exhausted that he died a few days after his arrival. The others are at Mr. Austin's farm in West Roxbury, and are doing well. Another Kerry bull has been ordered for Mr. Austin, which it is hoped will reach here in June next, so that through Mr. Austin's exertions it is believed the breed will be fairly introduced, and subjected to

such thorough trials as will settle the question in regard to their usefulness here.

I may mention, in this connection, that I also sent to Mr. Austin a three-year-old heifer, bred in one of the Shetland islands. This breed is noted for its hardihood, fine quality of beef, and rich milk—the latter afforded in moderate quantities. It is somewhat larger than the Kerry, but not so large as the Kyloe or West Highland, and is quite distinct in character from either—having short horns, a deep and rather narrow body, and a coat like soft wool. The breed probably came originally from Norway, as the Shetland islands were formerly possessed by that kingdom.

These are the British breeds which are considered specially adapted to dairy purposes. We have now in this vicinity the Ayrshire, the Jersey, and the Kerry, and it would seem advisable to give them such a trial here as will show whether or not they are on the whole better adapted to our purposes than the common stock. At the same time, as the cattle of the county consist mainly of the so-called "native breed," it would neither be practicable nor advisable to change it at once for any other. Such trials should in the first place be made as will clearly indicate the expediency of a change. But while experiments are going on with the dairy breeds which have been described, certain crosses may be made that would afford results tending to settle the question of the comparative merits of the common and lately-imported stocks. These crosses may be made at small expense between the common cows and imported bulls. If the cross-bred progeny should evince an improvement over the dams, it would be advisable to breed the heifers back to the variety to which the sire belonged, and continue to breed in this way so long as each succeeding generation evinces an improvement over the preceding.

Boston, January 15, 1860.

MILCH COWS.

ESSEX.

Statement of David Merritt, Jr.

GRADE COWS.—I present for premium my cow "Daisy." She is a Native, and was four years old on the 16th of last April. She dropped her second and last calf on the 3d of August, and will calve again about the last of May. From the 20th of last May to the present time her feed has been nothing but fair pasturage, except a little of the first crop of English hay at night and morning. Her milk has been measured morning and evening since the 5th of August, and an accurate account has been kept daily, which is annexed. During the first ten days of September it was twice weighed and found to average two pounds per quart, wine measure; and it takes nearly eleven quarts of her milk now to make one pound of butter.

Measure and Weight of her Milk for the first ten days in September, 1859.

1859.	Quarts.	Pints.	Half Pints.	Pounds.	1859.	Quarts.	Pints.	Half Pints.	Pounds.
Sept. 1, .	16	1	–	33	Sept. 7, .	15	1	–	31
2, .	16	1	–	33	8, .	16	1	–	33
3, .	15	1	–	31	9, .	16	1	–	33
4, .	17	–	–	34	10, .	14	1	1	29½
5, .	15	1	1	31½					
6, .	16	–	–	32		160	1	1	321

Measure and Weight of her Milk for the time between the 5th of August to the 27th of September.

1859.	Quarts.	Pints.	Half Pints	Pounds.	1859.	Quarts.	Pints.	Half Pints.	Pounds.
Aug. 5, .	14	1	–	29	Sept. 2, .	16	1	–	33
6, .	11	–	1	22	3, .	15	–	–	31
7, .	12	–	1	24½	4, .	17	–	–	34
8, .	12	–	1	24½	5, .	15	1	1	31½
9, .	14	–	–	28	6, .	16	–	–	32
10, .	12	–	–	24	7, .	15	1	–	31
11, .	13	1	–	27	8, .	16	1	–	33
12, .	13	–	–	26	9, .	16	1	–	33
13, .	13	1	–	27	10, .	14	1	1	29½
14, .	13	–	–	26	11, .	15	1	–	31
15, .	13	–	–	26	12, .	14	1	–	29
16, .	15	–	–	30	13, .	13	1	–	27
17, .	14	1	–	29	14, .	13	1	1	27½
18, .	15	–	–	30	15, .	15	–	1	30½
19, .	13	1	–	27	16, .	15	–	1	30½
20, .	14	–	–	28	17, .	14	–	1	28½
21, .	13	1	–	27	18, .	14	1	1	29½
22, .	13	1	–	27	19, .	17	–	–	34
23, .	14	–	–	28	20, .	16	–	1	32½
24, .	14	–	–	28	21, .	16	–	1	32½
25, .	14	1	–	29	22, .	15	1	1	31½
26, .	16	–	–	32	23, .	16	1	–	33
27, .	15	1	–	31	24, .	14	1	1	29½
28, .	15	1	–	31	25, .	14	–	–	28
29, .	17	–	–	34	26, .	14	1	1	29½
30, .	15	–	–	30	27, .	15	–	–	30
31, .	16	–	–	32					
Sept. 1, .	16	1	–	33		796			1,592

Daily average from August 5th to September 27th, 29½ pounds.
Daily average from August 5th to September 27th, 14$\frac{40}{84}$ quarts.

This cow came from a favorite cow, and was raised by E. S. Parker, on his farm in Groveland. She dropped her first calf December 21, 1857, at the age of two years and eight months. I bought her January 12th, 1858, and between then and the 13th of January, 1859, she gave 2,615 quarts of milk, beer measure, or 7,027 pounds, at 2 pounds and 11 ounces per quart, or 9 quarts 1 pint and 1 gill per day, wine measure, or 19¼ pounds per day for the year. In June, July, August and September her feed was nothing but common pasturing. Her feed for the other eight months of the year was four quarts shorts,

fourteen pounds of carrots, and as much second crop English hay as she wanted, usually about twenty-two pounds per day. The whole cost of keeping her for the year, including 75 cents per week for pasturing, 25 cents per week for driving, ($17.50,) $15 per ton for hay, and $9 per ton for carrots, was $71.46.

SALEM, September 28, 1859.

MIDDLESEX SOUTH.

Statement of S. O. Daniels.

The milch cow "Julia Lightfoot," which I offer for premium, was four years old, July 15, 1859, half Ayrshire, half Native, was raised and is owned by me. On the 27th of May she dropped a heifer calf, which you will see by her side. The calf was valued by several good judges of stock, to be worth $50 at two weeks. Her feed was grass from June 1st to August 10th,—very good in June and July. Since August 10th there has been no grass in my pasture which is completely dry. Her feed since that time has been cut meadow hay with two quarts shorts wet, and corn stalks daily.

Her product during ten days in June, was as follows:—*Quantity of Milk*—212 quarts 1 pint 1 gill; or 21 quarts $\frac{1}{2}$ pint per day. *Weight of Milk*—457 pounds or $45\frac{7}{10}$ pounds per day. *Weight of Butter*—20 pounds or 2 pounds per day—a very rich yellow.

Ten days in September, as follows: 157 quarts 1 pint, 1 gill, or nearly 16 quarts per day. *Weight of Milk*—$333\frac{1}{2}$ pounds or $33\frac{1}{3}$ pounds per day. *Weight of butter*—15 pounds or $1\frac{1}{2}$ pounds per day.

The five days following the ten days in June, she gave 106 quarts milk, making $11\frac{1}{4}$ pounds butter. (Five of the first ten being very wet.)

SOUTH FRAMINGHAM, September 20, 1859.

WORCESTER.

From the Report of the Committee.

This class of the exhibition was well represented, both in numbers and quality. Very fine specimens were presented of

the Ayrshire, Jersey, Devon, Short-horn, and native stock, besides various grades, or crosses from some one of those well-bred varieties with another, or with what are called "Native." For the last few years the attention of many of the farmers of this county has been turned to the improvement of their domestic herds by the introduction of the best blood for the dairy, and crossing it with the best native stock. The result has been a gradual increase, each year, in the entries of thorough-bred cattle at the society's exhibition, which this year assumes the most prominent place.

The cows entered for premium and exhibition coming under the inspection of the committee were 35 in number, nearly all of which were for exhibition only.

It is to be regretted that greater care is not taken by exhibitors to keep and render in to the committee more systematic and detailed accounts of the productiveness of their animals; the yield of milk and butter in a given time—quality as well as quantity being regarded; their mode of treatment, with the amount and cost of feed given; for by comparison of these experiments and observations, we may determine the best and most profitable stock for the farmer.

Your committee, in conclusion, would remark that in examining the stock presented for their inspection, they find such evidence of the superiority in the improved breeds, that they cannot refrain from earnestly recommending it to all stock growers; and by patronizing its introduction, by liberally encouraging those persons who have, at the cost of much time and money, introduced those fine breeding animals that were on exhibition to-day, the object will be attained.

HENRY F. WING, *Chairman.*

WORCESTER NORTH.

From the Report of the Committee.

There were twenty-seven cows and ten heifers on exhibition, for their superior milking properties, making the show, in the department of milch cows, very satisfactory both as to number and quality; clearly showing that the farmers of Worcester North are fully conscious of the importance of having a good

dairy and good dairy stock. On this point, perhaps nothing need be said. But there is one subject connected with keeping dairy stock, that has not been sufficiently considered by many of our farmers; indeed, some of them seem to have given it no thought whatever. Since convenient communication with the city has been opened by railroad, many have turned their attention to the production of milk; in fact, some make it the chief business of the farm. Now, to all such it is an important question, whether, by this process, they are not gradually but surely impoverishing their farms. Can three hundred, five hundred, or a thousand dollars worth of milk be annually carried off from the farm without diminishing the capability of the soil for future production? Certainly not, unless some proportionate quantity of fertilizing material is brought back to it over and above the manure made from milk-giving cows. For it is a well-established fact that the droppings from milch cows are much less strong and active than from other stock, and particularly from animals under the process of fattening.

In our eagerness to obtain ample, immediate returns for our labor, we must not forget that the true object of the farmer should be, not to get the largest amount from the farm at the present time, merely, but to pursue such a system of cultivation that the soil shall, after each successive crop, be left in better condition than before. Under the old method of making butter from the milk, and feeding the skimmed milk to swine, there was far less danger of a gradual deterioration of the soil than by the system now under consideration; for during the growth and fattening of the swine, a large, if not an adequate amount of manure, would be made ready for application to the land. In Great Britain and on the Continent of Europe, there are large tracts of land that have been under constant cultivation for hundreds of years, and yet, at this very time, the capacity of the soil for production is greater than at any former period. This is brought about by feeding largely of the products of the farm, in hay, roots and grain, to cattle, sheep and swine fattened for the market, thus making their manure more valuable; and also by no inconsiderable annual outlay for the purchase of various fertilizers brought from abroad. Mr. Holbrook, of Brattleboro', one of the best cultivators of the soil in Vermont, thinks that the farmer cannot afford to sell any considerable

amount of the grain raised on the farm; but that in a succession of years, he will realize the greatest profit by feeding most of his grain crop to his stock, thereby increasing the fertility of the soil by their more enriching manure, depending mainly for his cash returns upon the meat sold in the market. Mr. John Johnston, of Geneva, New York, finds that he cannot keep his land in a sufficiently fertile condition for profitable production of wheat unless he buys largely of oil-meal to feed to his stock, chiefly for the purpose of making more active manure. The English farmers say they don't understand how their brethren on this side of the Atlantic can afford to export their oil-meal cake. Now, if Mr. Holbrook, of Vermont, an experienced and successful farmer, is convinced that in the "long run" it is better to have most of the grain crop fed to the animals on the farm, besides all the hay and the other fodder; if Mr. Johnston, of New York, in the heart of the "Genesee country" is satisfied that his land needs the fertilizing effect of a large consumption of oil-meal by his stock, and if the English rightly estimate the value of their land by the amount of meat produced for the market, how can we, on this hard New England soil, maintain even, much less *improve*, its productive power, if we keep up a constant drain upon its fertility by making milk its chief product, and sending it away to consumers? Let those who are able answer the question. The subject is worthy the serious consideration of all producers of milk.

C. C. Field, *Chairman.*

N. B. Reed's Statement of Herd of Cows.

White Head is mixed breed, nine years old, calved May 4th, 1858, time to calve again March 2d, 1860. Was raised in Sterling. She gave the first seven days in June, two hundred and sixty-one pounds of milk, an average of thirty-seven and one-seventh pounds per day. She gave the first seven days in September, two hundred and eighteen pounds, an average of thirty-one and one-seventh per day. Her calf is a heifer; am raising it.

White Foot is mixed breed, four years old, calved March 27th, 1859, time to calve again March 12th, 1860. Raised her. Her calf I sold at six weeks old for $10.50. She gave the first

seven days in June, two hundred and twenty-three pounds of milk, an average of thirty-one and six-sevenths pounds per day. She gave the first seven days in September, two hundred and eighteen pounds of milk, an average of thirty-one and one-seventh pounds per day.

Beauty is mixed breed, six years old, calved February 2d, 1859, time to calve again March 12th, 1860. Was raised by myself. Her calf I sold at five weeks old for $8 for veal. She gave the first seven days in June, two hundred and fifty-seven pounds of milk, an average of thirty-seven and five-sevenths pounds per day. She gave the first seven days in September, one hundred and eighty-six pounds of milk, an average of twenty-seven and four-sevenths pounds per day.

Tamar is mixed breed, five years old, calved February 22d, 1859, is to calve again April 3d, 1860. Was raised in Princeton. Sold her calf at six weeks old for veal for $11. She gave the first seven days in June, two hundred and thirty-three pounds of milk, an average of thirty-three and two-sevenths pounds per day. She gave, the first seven days in September, one hundred and seventy-one pounds of milk, an average of twenty-four and two-sevenths pounds per day.

Danforth Heifer is mixed breed, two years old, calved May 17th, 1859, is to calve again May 12th, 1860. Her calf I sold at six weeks old for $10 for veal. She gave the second week in July, an average of thirty pounds of milk per day, from which was made six and one-fourth pounds of butter. She gave, the first seven days in September, twenty-four and one-half pounds of milk per day.

The above cows were turned to pasture the first of May, and they had no extra keeping at either trial.

Statement of John Brooks, Jr.

Herd of Cows.—The four cows that I enter for the best herd are as follows, viz. :—

First, *Donna* is Devon, eight years old, calved April 27th, 1859, bull calf, five months old, weighs three hundred and seventy pounds. She gave, the first seven days of June, two hundred and five pounds milk ; two inches in ten of her morning's, and one and four-fifths inches in ten of her evening's milk

was cream. At the above trial her average weight was seven hundred and ninety-one pounds morning, eight hundred and sixty-four pounds evening. She gave, the first seven days of September, one hundred and eighty pounds milk; two and one-fifth inches in ten of her morning's, and one and four-fifths in ten of her evening's milk, was cream. At this trial her average weight was eight hundred and forty pounds morning, eight hundred and sixty pounds evening.

Second, *Mary* is one-half Ayrshire, six years old, calved April 4th, 1859. Sold the calf at six weeks old for $7. She gave, the first seven days of June, one hundred and ninety-six pounds milk; one and one-fourth of an inch in ten of her morning's, and one and one-tenth of an inch in ten of her evening's milk was cream. At the above trial her average weight was eight hundred and twenty pounds morning, eight hundred and fifty-seven pounds evening. She gave, the first seven days of September, one hundred and ninety pounds milk; one and three-tenths of an inch in ten of her morning's, and one and one-tenth of an inch in ten of her evening's milk was cream at this trial. Her average weight was eight hundred and forty pounds morning, eight hundred and sixty-three pounds evening.

Third, *Flash* is seven-eighths Ayrshire, four years old, calved March 6th, 1859. The calf was worth at six weeks old, for veal, $10. Raised it. She gave, in seven days, from the 9th to the 15th of June, two hundred and eleven and one-half pounds milk; one inch in ten of her morning's, and nine-tenths of an inch in ten of her evening's milk was cream at the above trial. Her average weight was eight hundred and sixty-four pounds morning, nine hundred and eighteen pounds evening. She gave, the first seven days of September, one hundred and eighty-eight pounds milk; one inch in ten of her morning's, nine-tenths of an inch in ten of her evening's milk was cream at this trial. Her average weight was nine hundred and twenty-one pounds morning, and nine hundred and fifty pounds evening.

Fourth, *Gregory* is one-half Ayrshire, thirteen years old, calved May 20th, 1859. I did not try her milk the first seven days of June. The first seven days of September she gave two hundred and eleven and one-half pounds milk; one and one-

half inches in ten of her morning's, and one and three-tenths of an inch in ten of her evening's milk was cream. Her average weight was one thousand one hundred and sixty pounds morning, one thousand one hundred and eighty pounds evening.

The above cows were turned out to pasture the 15th of May, and have had no other keeping since that time, until the middle of August, when I turned them out after milking at night into a mowing.

Statement of J. P. Reed.

The cow which I offer for premium is eight years old, of the Holderness breed. Dropped her calf on the 5th of August last. I commenced weighing her milk on the ninth day of the same month, and for the next seven days she gave three hundred and twelve pounds, being an average of forty-four and four-sevenths pounds per day. The first seven days in September she gave an average of forty-two pounds per day. Keeping, nothing but pasture feed. Her milk is of the best quality. She has never had any meal, grain or roots. The society's second premium was awarded me for her last year.

Statement of Daniel Messinger.

The three-years old heifer which I offer for premium dropped her first calf on the 11th day of last April. Sold the calf at three days old. Have measured her milk from April 15th to September 15th. The result is as follows:—

From April 15th to June 15th, an average of twelve and three-fifths quarts per day. From June 15th to July 1st, twelve quarts per day. From July 1st to July 15th, ten and one-half quarts per day. From July 15th to September 15th, nine and two-fifths quarts per day. The weight of her milk the first week in June, two hundred and fourteen and one-fourth pounds. The first week in September, one hundred and fifty-one and three-fourths pounds. My pasture being quite small and insufficient to pasture one cow, was obliged to feed with hay from the barn, and the last part of the time some corn stalks. I think the quantity of milk would have been much increased had she been turned to good fall feed.

From about two weeks previous to her calving to the 15th September, have given her one bushel oats, and one and one-half bushels wheat and rye bran, at a cost of about three-fourths of a cent per day. The milk very good; seven and seven-eighths quarts, beer measure, to one pound of butter.

Statement of Jabez Fisher.

The milch heifer which I enter for premium, was two years old the first day of May last. Her breed is Durham and Native, in uncertain proportions. She dropped her calf July 7. She gave, in seven days, commencing July 24, one hundred and sixty-five and one-fourth pounds of milk, averaging twenty-three and sixty-three one hundredth pounds per day. She gave, in the first seven days of September, one hundred and sixty and one-fourth pounds of milk, averaging twenty-two and eighty-nine one hundredths pounds per day. She was kept in the barn all the time, and fed with hay and such green fodder as the farm would furnish.

From the Report on raising Dairy Stock.

The raising of stock at the present day is a paying business, if properly managed; and I believe that more depends upon the selection of the calf, than the breed, care being taken to raise such ones as will pay for beef, if they fail to be fit for the dairy. It is useless, in my opinion, to be too very particular about names of breeds, or to attempt to follow the fashion of trying to raise blood stock, as that requires too much outlay of money and time for common farmers, but breed from good animals, and raise only the best of any breed, as there are a great many that are not suitable. In raising, during the first ten or twelve weeks, care should be taken to avoid the extremes of too high or short feeding, but take good care of them for the first year, keeping them in a healthy growth. After that, they will require only ordinary attention.

I have been led to adopt these opinions from the fact that, after all that is said in favor of blood stock, and the attempt of the owners and breeders of it to put down all grade stock, the market-man tells me that it is from them he gets his poorest calves for veal.

Ezra Kendall, *Chairman.*

HAMPSHIRE, FRANKLIN AND HAMPDEN.

From the Report of the Committee.

Your committee regret to say that only five of the exhibitors complied with the rules of the society, in furnishing written statements, as follows:—

"Competitors for premiums on milch cows shall present to the committee a statement in writing, of the mode of feeding, weight of milk given, and the amount of butter made from each cow for seven successive days of the present season. Blood and breeding qualities to be taken into consideration.

"Loose, verbal statements, made at the time of the exhibition, cannot be relied on, or received."

Such accurate statements are necessary, because nothing of permanent value can be obtained in regard to their milking qualities, without careful trial and well-attested experiment; it was this that has perpetuated the fame of the celebrated "Oakes Prize Cow," although she was in her glory more than forty years ago. It is recorded of her that she made 467¼ lbs. of butter in 30 weeks, and in the week ending June 5, 1816, the average weight of her milk was 44⅓ lbs. per day, from which 19 lbs. of butter were made. We have reason to believe that as good cows have been owned and can at present be found within the limits of this society; their fame would not be allowed to perish if their owners would carefully test their capacities for producing butter and milk, and give the statements thus obtained to the public; people would have more confidence in statements made on such a basis than in those made up on the spur of the moment in order to meet the rules of the society, and get the premium.

J. G. HUBBARD, *Chairman.*

Statement of A. J. Lincoln.

My cow has been new milch since about the middle of March last, and has been owned by me since May 1st, 1859. During the month of May, she was fed upon cut hay, and six quarts of corn-meal and rye bran, of equal parts, per day. She gave of

milk during this month, 1,178¼ lbs., equal to 38 lbs. per day. June 1st, she was turned out to pasture and no extra feed given—and for the month of June gave 1,220½ lbs., equal to 40⅔ lbs. per day. For seven successive days in June, viz., from 10th to 17th, she gave as follows: 10th, 41¾ lbs.; 11th, 42 lbs.; 12th, 39¾ lbs.; 13th, 41 lbs.; 14th, 41 lbs.; 15th, 41 lbs.; 16th, 41¾ lbs.; equal to 287 lbs., or 41 lbs. per day. For the month of July, she gave 1,130 lbs., equal to 36½ lbs. per day. For three months ending July 31st, she gave 3,528¾ lbs., equal to 38⅓ lbs. per day. Milk was sold, and no butter made. Pedigree or blood not known to the owner, but supposed to be part Durham.

Northampton, Sept. 29, 1859.

Statement of William B. Hale.

My cow is a grade Short-horn, eight years old. She was raised by Ephraim Williams, of Deerfield, of whom I bought her Nov. 25, 1857, two weeks after calving. From this time till June 21, 1859, (when she again calved,) a period of 572 days, she gave 13,056 pounds 3 ounces of uncommonly rich milk, an average daily for the whole time, (including 24 days in which she was dry,) of 22 lbs. 13 oz.,—over nine beer quarts or eleven wine quarts.

No butter was made.

395½ quarts milk were sold at 4c.,	. . .		$15 82
2,741 " " " " 5c.,	. . .		137 05
1,958½ " " " used in my family,	. .		97 92
			250 79
The cost of hay and pasturage was	. .	$85 75	
" " meal,	. . . . .	38 66	
" " roots, &c.,	. . . . .	10 00	
			134 41
Net profit,	. . . . .		$116 38

Her feed the first winter was uncut and slightly damaged hay, four quarts daily of Indian meal, rye or wheat shorts, mixed in equal quantities by weight, and scalded, and part of the time a little broomseed.

During the summer she was soiled part of the time, and some time pastured; she had also one quart of mixed meal a day, and in early fall a few windfall apples.

The second winter her feed was rowen and first crop hay, cut and scalded, half a peck daily of pumpkins or carrots, and four quarts of scalded mixed meal, as the winter before.

The 13th, 14th and 15th months after calving, her average daily yield was 22 lbs. 9 oz. The two weeks previous to calving, in June last, her food was hay alone, as she was getting to be dangerously fat. Her largest yield during these nineteen months was 32 lbs. 7½ oz.

Owing to her tendency to shed her milk, (her only fault, and but for which her product would have been several hundred pounds larger,) she was milked three times a day during the summer of 1858.

Since calving last, she has averaged about 35 lbs. a day from two milkings only. Several days she has given over 42 lbs., and her present yield is over 34 lbs.,—on grass feed with one quart of meal.

NORTHAMPTON, Sept. 1859.

HAMPDEN.

From the Report of the Committee.

The whole number of entries in this class was seven, five single cows, and two herds. Two of the entries were represented, and a choice herd of seven from the City Farm were represented without entry. Of the four single cows present and entered, only one had a written statement of her summer's work. This cow belonged to William Birnie, of Springfield, and was a thorough bred four-year-old Ayrshire, of 800 pounds weight. The following statement was furnished by her owner.

"My cow, 'Kitty the Fourth,' calved the 25th of March last. We commenced to weigh her milk April 1st. During the month of April she gave 1,127 pounds of milk; in May, 934 pounds; in June, 1,025 pounds; in July, 972 pounds; in August, 912 pounds; total in five months, 4,753 pounds. Her feed has been pasture, green hay, and corn stalks."

The other cows present without the required credentials, were a thorough bred three-year-old Jersey, lately purchased by H. J. Chapin, a large two-and-half-year-old heifer, owned by I. H. Montague, and a grade Ayrshire, by D. S. Rowland, all of Springfield. There was still another cow alone on the grounds, with excellent marks, and apparently worthy of the highest honors, but because she wore no badge of the society telling of her ownership, your committee felt reluctantly obliged to give her the cold shoulder. In herds of cows, Samuel D. Smith of West Springfield, was the only exhibitor that complied with the regulations of the society. He exhibited six cows, of mixed breeds, and of ages varying from two to six years. He stated that two of his cows were dry, but the remaining four yielded from the 10th to the 20th of September, 300 quarts of milk. Mr. Smith sells his milk daily at his door for three cents a quart. From the 10th of June to the 10th of July, he has sold from these cows $51.16 worth, or 1,372 quarts. Their feed has been pasturing, to which they were daily driven two miles from home, and occasionally corn fodder. Only two of these cows appeared at all extraordinary to your committee, but on account of Mr. Smith's strict compliance with the rules of the society, and the peculiar difficulties under which he labored in keeping his stock upon the ground for two days in the storm, we advise a special premium of ten dollars.

The matter of premiums being disposed of, before making our retiring bow to the directors of the society for the honors conferred, we desire to place upon record for the public benefit, some of the principles that have governed us in the performance of our work. First, we seriously considered the question, —What constitutes a good milch cow? At the outset we started with the idea that neither man or breeds should influence us, and that flesh and color were matters of secondary consideration. It was agreed that a cow to be worthy of the society's premium, should not only have the written particulars of her worth from the hands of her owner, but certain unmistakable external marks, which the best cows usually carry. The first and most important of these marks, we beleived, were the veins of the belly. A large, long, crooked, visible vein on either side of the animal running forward from the udder and terminating in a deep cavity, is the invariable accompaniment of

a great milker. Sometimes the veins differ in size on opposite sides of the belly, and in those cases the udder is rarely regular shaped, but gives more milk on one side than the other.

Our beau-ideal of a milch cow is an animal, in form wedge-shaped,—with the head on the little end, with an udder longer than it is broad, with four teats of equal size and length, with short, yellow horns, bright eyes, soft, yielding skin, flexible rump, and last, but not least, a high, broad escutcheon. An animal with these marks might be worthy, but would not long stand in need of the society's premium. Such an animal would make her mark anywhere. The difference in the product and profit of cows is perfectly astonishing. The best milkers on record have given from twenty-five to thirty quarts of milk daily, and one instance is vouched for in Flint's "Dairy Farming," where a Dutch cow gave not less than twenty-two quarts daily a whole year after calving. The best cows never go dry without special pains, and then only for brief periods. The old big-horned brindle of our boyhood, even now rises in imagery before us. Four years we knew her, and during that time she never for a day withheld her lacteal treasures. Four calves she had in those years, and twenty-six pounds of milk was once her yield at a single sitting, twice for ten days in June and ten in September, she reached the average of fifty pounds of milk daily. So nicely poised were her developments, that seemingly a single cabbage leaf increased her lacteal quantity. Thin and bony always, her generous bosom continually expanded with the milk of kindness. Her breasts literally were full of milk, if her bones were not moistened with marrow. Under her tuition we learned the use of cream. Her golden and waxy butter was a continual feast. Her milk furnished our youthful arms with the sinews of war. To us she was indeed a faithful friend. At last she died full of years and honors, and her memory is embalmed in at least one human heart. Ever since that time we have loved the cow. Blessed be the race; without their kindly aid Young America would shrivel. Calves, pigs and babies all thrive on milk. As a popular institution, the cow is unrivalled.

J. N. Bagg, *Chairman.*

From the Report on Heifers.

In many societies premiums have been given without regard to best qualities, because the animal was fat, smooth and large. This, the committee decided to be wrong, and therefore laid down the following rules as a guide in the discharge of their onerous duties.

Rule 1st. Animals showing the best marks and most points as a breeder. Rule 2d. Animals having the most and best points as a milker and for dairy purposes. These qualities combined, the committee judged to be all that was necessary to make a cow profitable to the farmer, and they were of the opinion that all animals of the bovine kind which lacked those qualities were only fit for the slaughter-house when well fatted.

Perhaps you will ask what are the marks and points that indicate a good milker and breeder. We will endeavor to give them according to our judgment and that of others. The head rather small, wide across the eyes, muzzle fine, nostrils open and spreading, the eye large, full and bright, expressing mildness and intelligence, ears thin, neck small at its junction, with the head and back straight, flanks deep and full, legs rather short, small and flat below the knee and hock, tail slender, except at its upper end, mellow and elastic skin of a yellowish color, indicating richness of milk, milk-veins large and springing out near the fore legs, and appearing well developed along the body. These marks are essential in all heifers and cows whether young or old, in order to make them profitable to the farmer or dairyman.

JAMES WALLACE, *Chairman.*

PLYMOUTH.

From the Report of the Committee.

In submitting this report, your committee (on cows and calves) deem it incumbent upon them to say that their awards have not been made in accordance with "the quantity of milk and butter for ten successive days in the months of June and September," but, presuming the objects of the society to be to ascertain as well what breeds of stock are best adapted to the

soil and climate of the county, they have allowed these considerations to influence them in their conclusions.

The cow of Mr. Whitman, to which we have awarded the first premium, is evidently a Native cow, (with possibly a small amount of Devon blood,) and the fact that from June to September her milk and butter show a decrease of but 31 per cent., notwithstanding the dry weather during the latter month, with the general hardy appearance of the cow, was, to us, the strongest evidence that she is of a pedigree which our farmers would do well to propagate in this county.

In contrast with the above named cow is that of Charles G. Davis, Esq. This cow is a full-blooded "Jersey," and has been introduced by the president of our society for the purpose of improving the stock of milkers in our county. The statement of Mr. Davis shows that this cow (Venus) is an excellent milker, that the milk is of almost unparalleled richness, and with the best of keeping and nursing we have no doubt she will produce large results. But her whole appearance, in our judgment, fully justifies the apprehensions of stock raisers, that the Jerseys are not, without extraordinary care, adapted to our rigid soil and changeable climate.

A cross of Ayrshire and Native, in the cow of Mr. Lewis Leonard, the heifer of Mr. Spencer Leonard, Jr., and the yearling of Mr. Calvin Chamberlain, offers specimens which sustain our theory that a mixture of our native blood is essential to the production of such stock for the dairy, as is required for the soil and climate of Plymouth County.

But let us not be understood as expressing an opinion that the "milch cows" which have been exhibited to us are by any means perfect specimens of what is required, nor indeed of what is kept in our county. For some cause, of which we are ignorant, the farmers of the county are reluctant to exhibit their stock, and the result is that premiums have to be awarded to stock very much inferior to specimens which might be produced. The cow of Sydney Packard, for which we have recommended a gratuity, in our judgment is superior to any to which we have awarded premiums, but the fact that he sells his milk instead of making butter, prevented her from being entered for premium, the owner understanding that such a disposition of his milk debarred him from the benefits of a premium. If it

is to this cause that the society is indebted for no better exhibition of "milch cows and heifers," we would hope such a change might be adopted as to avoid the difficulty, and that in future we shall have such a show of dairy stock as is worthy the reputation we have hitherto enjoyed in Plymouth County.

MOSES BATES, *Chairman.*

JERSEYS.

ESSEX.

Statement of Richard S. Fay.

I send for exhibition only, not wishing to compete for a premium, three Jersey cows, three yearlings and three calves, all pure bred, to which I beg to call your attention. My farm is as little adapted for rearing stock and for the production of milk as any one that can be found in the county, the soil being gravelly and hungry, and the pastures, from a half a century of neglect, entirely overrun with bushes and wood-wax. It seemed to me that land of this description afforded a favorable opportunity for testing stock of various kinds as to hardiness and constitution, if for nothing else, and these animals which I have sent to the exhibition are the result of one of the experiments which I have been making. I do not mean to boast of having good cows living upon nothing, for I should feel ashamed of having any animal which was not as well treated as the nature of the case will admit. I only mean to say that the character of my soil will not admit of very good treatment, and that no animal can do as well upon it as upon land of a better character. I have treated these animals precisely as I have treated others of my herd, so as to be able to compare the results, and I have for this purpose selected the best animals of our native stock that skill could raise or that money could purchase. All this should be borne in mind in looking at the dairy product of the animals. I must also ask you to take my assertion, so far as comparative excellence goes,

that these cows are ahead of the lot in all respects. They are, (yearlings and calves included,) in better condition than any others of native growth upon my farm treated in the same manner. The average yield of milk, as I have said, is greater, and the quality vastly superior.

There is one advantage which this breed possesses, from being constant milkers. For example, No. 1 will calve in about twelve days. She is five years old and has never been dry since her first calf. She is not at any time a large milker, but her milk is of the richest character, and will average about eight quarts per day throughout the year. On a good soil she would probably add a third to this result. The other two are equally good in all respects with a larger average of milk through the year. The test by the lactometer as to the quality of the milk I have already given at the foot of the milk table. They are both with their third calf, each being a year younger than No. 1.

I am accustomed to make records of milk by the quart, as easier from habit, but the milk of these cows has been weighed from time to time, and it has varied so little from two lbs. three ounces to the quart, sometimes exceeding and sometimes falling off from that standard in a degree hardly noticeable, that I have contented myself by simply putting the total in pounds.

I send these animals as the highest specimens I have of the class, being of the best stock that has ever been brought to this country, in order to enable you to compare them with other breeds which I hope will be equally well represented.

Since writing the above I have concluded not to send the yearlings on account of the trouble of driving so much young stock. I am aware that many will read the statement as to the richness of the milk which these cows give with incredulity ; to such, however, I can only say that they are open to the trial and inspection of any one, and that the cows have had only pasture feed at the time of the trial, with green corn fodder at night.

Lynmere, Sept. 27, 1859.

[For Statement of result of Trial, see next page.]

No. 1—"Looly."

	Quarts.				Quarts.		
	Morning	Evening.	Total.		Morning	Evening.	Total.
June 1,	3	5	8	Sept. 1,	$2\frac{3}{4}$	$3\frac{1}{4}$	6
2,	$3\frac{1}{4}$	$4\frac{3}{4}$	8	2,	$2\frac{3}{4}$	$3\frac{1}{4}$	6
3,	$3\frac{1}{4}$	$4\frac{3}{4}$	8	3,	$2\frac{3}{4}$	$3\frac{1}{4}$	$6\frac{1}{4}$
4,	$3\frac{1}{2}$	$4\frac{1}{4}$	$7\frac{3}{4}$	4,	$2\frac{3}{4}$	$3\frac{5}{8}$	$6\frac{3}{8}$
5,	$3\frac{3}{4}$	$4\frac{1}{4}$	8	5,	$2\frac{5}{8}$	$3\frac{5}{8}$	$6\frac{1}{4}$
6,	$3\frac{3}{4}$	$4\frac{1}{4}$	8	6,	3	$2\frac{3}{4}$	$5\frac{3}{4}$
7,	$3\frac{1}{4}$	5	$8\frac{1}{4}$	7,	$3\frac{1}{4}$	$3\frac{1}{4}$	$6\frac{3}{8}$
8,	3	$4\frac{3}{4}$	$7\frac{3}{4}$	8,	$2\frac{3}{4}$	$3\frac{5}{8}$	$6\frac{3}{8}$
9,	$3\frac{3}{4}$	$4\frac{3}{4}$	$8\frac{1}{2}$	9,	$2\frac{3}{4}$	$3\frac{1}{4}$	$5\frac{7}{8}$
10,	$3\frac{1}{4}$	$4\frac{1}{2}$	$7\frac{3}{4}$	10,	3	$3\frac{1}{4}$	$6\frac{1}{4}$
Total,	.	.	80—180 lbs.	Total,	.	.	$61\frac{1}{2}$—138 lbs.

Calved October 24th, 1858; will calve again October 13.
By the Lactometer, September 27th, 7 parts of milk to 12 hours, producing 1 11-20 parts of cream.

No. 2—"Rosa."

June 1,	6	$7\frac{1}{2}$	$13\frac{1}{2}$	Sept. 1,	$4\frac{1}{8}$	$4\frac{1}{4}$	$8\frac{3}{8}$
2,	$6\frac{1}{2}$	$6\frac{1}{2}$	13	2,	4	$4\frac{3}{4}$	$8\frac{3}{4}$
3,	$6\frac{1}{4}$	7	$13\frac{1}{4}$	3,	$4\frac{1}{4}$	$4\frac{3}{4}$	9
4,	$6\frac{1}{4}$	7	$13\frac{1}{4}$	4,	$4\frac{3}{4}$	$5\frac{3}{4}$	$10\frac{1}{4}$
5,	$5\frac{3}{4}$	$6\frac{1}{2}$	$12\frac{1}{4}$	5,	$3\frac{3}{4}$	$4\frac{1}{4}$	8
6,	$5\frac{3}{4}$	$8\frac{3}{4}$	$14\frac{1}{2}$	6,	$5\frac{1}{4}$	$4\frac{3}{4}$	10
7,	$4\frac{1}{2}$	$8\frac{1}{4}$	$12\frac{3}{4}$	7,	$4\frac{1}{4}$	$4\frac{1}{4}$	$8\frac{1}{2}$
8,	6	$7\frac{1}{2}$	$13\frac{1}{2}$	8,	4	4	8
9,	$6\frac{3}{4}$	$7\frac{1}{2}$	$14\frac{1}{4}$	9,	$3\frac{1}{2}$	4	$7\frac{1}{2}$
10,	$6\frac{1}{4}$	7	$13\frac{1}{4}$	10,	3	4	7
Total,	.	.	$133\frac{1}{2}$—208 lbs.	Total,	.	.	$85\frac{3}{8}$—194 lbs.

Calved April 9th, 1859; will calve again March 2d.
September 27th, 7 parts of milk produced 1 12-20 parts of cream.

No. 3—"Gentle."

June 1,	6	6	12	Sept. 1,	4	$4\frac{1}{4}$	$8\frac{1}{4}$
2,	$6\frac{1}{4}$	7	$13\frac{1}{4}$	2,	$4\frac{1}{4}$	4	$8\frac{1}{4}$
3,	$6\frac{1}{4}$	6	$12\frac{1}{4}$	3,	$3\frac{1}{2}$	$4\frac{3}{4}$	$8\frac{1}{4}$
4,	6	$5\frac{3}{4}$	$11\frac{3}{4}$	4,	$4\frac{1}{8}$	$4\frac{1}{2}$	$8\frac{5}{8}$
5,	5	7	12	5,	$3\frac{3}{4}$	5	$8\frac{3}{4}$
6,	$4\frac{1}{2}$	$7\frac{3}{4}$	$12\frac{1}{4}$	6,	$3\frac{3}{4}$	5	$8\frac{3}{4}$
7,	$5\frac{1}{2}$	$7\frac{1}{2}$	13	7,	$4\frac{1}{4}$	$4\frac{1}{4}$	$8\frac{1}{2}$
8,	5	$6\frac{1}{4}$	$11\frac{1}{4}$	8,	$4\frac{1}{2}$	$3\frac{3}{4}$	$8\frac{1}{4}$
9,	$5\frac{1}{4}$	$7\frac{1}{4}$	$12\frac{1}{2}$	9,	4	$3\frac{5}{8}$	$7\frac{5}{8}$
10,	5	$6\frac{3}{4}$	$11\frac{3}{4}$	10,	$4\frac{5}{8}$	$4\frac{1}{4}$	$8\frac{7}{8}$
Total,	.	.	122—274 lbs.	Total,	.	.	$84\frac{1}{8}$—191 lbs.

Calved May 15th, 1859; will calve again March 11th.
September 27th, 7 parts of milk produced 1 10-20 parts of cream.

DEVONS.

WORCESTER.

From the Report of the Committee.

DEVONS.—The special committee appointed by the committee of arrangements to judge and report upon the relative merits of the different animals exhibited in this class to-day, were greatly gratified to find so many choice specimens of this pure and beautiful breed of cattle brought together by the enterprising members of this society, without any expectation of a pecuniary reward, and we regret very much that the funds of the society will not permit the encouragement, by liberal premiums, of the breeders of thorough-bred stock in this county. We were ourselves, and think every one else that witnessed our exhibition to-day, was convinced that it is for the interest of every farmer to start upon this principle of breeding.

The North Devons are a very beautiful, pure-bred race, and have been improved by selecting the most perfect specimens to breed from; not having been crossed at all, as it is generally understood. This purity of blood has made them more characteristic than most other breeds, and the first cross appears more uniform than most grades. The cow yields very rich milk, and some families a full average quantity. Their uniform bright red color, with many gives them great value. They are hardy, active, and of even disposition, and for the yoke they are unrivalled.

N. B. CHASE, *Chairman.*

SHORT-HORNS.

WORCESTER.

From the Report of the Committee.

The province of this committee, under their assignment, was the inspection, merely, of such animals of the breed of Short-horns as should be offered for exhibition. No rules were prescribed for their action, and no premiums proposed for their

adjudication. The appeal by the committee of arrangements to the owners of such animals was addressed to their public spirit, to contribute to the interest of the show, by the production of their fine cattle, and through this agency, to encourage their more general dissemination and the higher improvement of the stock of the county. As no statement of pedigree, or product, or mode of treatment, or expense of feeding, had been required of the exhibitors, and, with but partial exceptions, none were offered to the committee, the examination of the animals was, with them, of external points and general appearance only, with but little means of obtaining information for the instruction of others. Hence this report must necessarily be meagre in all those facts which should primarily be sought for in such exhibitions, and are most wanting for public communication.

The Short-horn breed has long been known in England as a distinct variety of cattle, and is believed to have originated in Holland. They were first introduced for their milking qualities, and afterwards, through spirited and vigilant care and attention, by observant and skilful breeders, about the beginning of the present century, they were brought to excel all other breeds in the properties most valuable for the farm and market. Martin, a British writer of large observation and great celebrity, in treating of this breed, as found in the counties of Durham and York, exclaims with admiration: "How great is the change which the breeder's pains and care have effected! In no strain of cattle is this more palpable, for now, while their milking properties are preserved, the tendency to fatten is brought to a very high ratio, and these qualities are combined with size, a magnificent figure, the production of beef most beautifully grained and of highest excellence; — qualities, indeed, hitherto considered as incompatible with each other, meet together in the improved Short-horns of Holderness or Teeswater celebrity." He adds to this, that "they excel in these three valuable particulars, viz.: in affording the greatest quantity of beef, tallow, and milk." The marvellous sales at almost incredible prices, by Mr. Charles Colling, in 1810, of a large herd, at from fifty to one thousand guineas for a single bull, and from thirty-five to four hundred guineas for a cow, and in 1818, by Mr. Robert Colling, of his herd of the same

breed, at prices equally high, give no equivocal attestation to the estimation of the stock, at those periods, by the most enlightened and enterprising breeders in England. Since that time, sagacious and public-spirited gentlemen continued their attention to the still further improvement of the breed, either for the dairy or the shambles, until, as Martin says "they were everywhere spreading, and their value was generally appreciated, and it may reasonably be expected that in a few years, they will either supersede or greatly modify the old breeds of most of the English grazing and breeding districts."

From the stock of Mr. Charles Colling, descended that famous Short-born bull, "Young Denton," reared by Mr. John Wetherel, a breeder of much eminence, and imported about thirty years since, into this county, by Stephen Williams, Esq., a former vice-president of this society. This bull was of the "Teeswater celebrity," known as the improved Durhams, eminently characterized by Mr. Cully, another English writer of admitted authority, "for the quantity of milk which they give, beyond any other breed." There are instances cited, of cows yielding thirty-six quarts of milk per day, while it is said that twenty-four quarts is but the usual quantity. Martin records the case of a single cow, on which the experiment was made, which returned three hundred and seventy-nine pounds of butter in the space of thirty-two weeks—the lowest weekly amount being seven pounds, the highest, sixteen. The milk during the time averaged nearly twenty quarts per day. Her food, grass and cut clover, until the turnip season, but the pasture was not of first-rate quality.

There is reason to believe that of late years, in England, in the breeding of Short-horn cattle, the interest of the grazier has prevailed over that of the dairyman, and maturity at an early age, with aptitude to fatten, have been more regarded than milking properties. A distinguished gentleman, an active and public-spirited officer of our own society, recently in that country, has said, that, after diligent inquiry, he was unable to find, for purchase, a single thorough-bred improved Short-horn of the Teeswater strain; and he was informed that, even in the valley of the Tees, they had been suffered to run out or had been intentionally bred into stock for size and greatest demand in the beef market. Although the milking quality has

not been entirely overlooked, the quicker and greater profits in the shambles have been first sought for, and to this end the most recent efforts have been directed, to promote weight and quick fattening in cattle. How far these tendencies constitute a characteristic in families of Short-horns from which importations of late have been made into this country, may not be so well understood, but certain it is that individual animals of the breed, under the same general denomination of Short-horns, possess and transmit very different properties, or the same properties in very different degrees; for while the magnificent looking cattle brought into Kentucky and Ohio are remarkable for their product of beef, on account of their milk they will compare with the yield of the stock of the improved Durhams in the blood of Denton, Admiral, Cœlebs, and Holderness, all formerly imported into Massachusetts. And does not this consideration suggest the importance, when seeking for stock animals, of regarding, not merely the general characteristics of the race, but also of inquiring into the peculiar properties by which, through diverse interests in breeding, different families of the same breed come at last to be distinguished.

In offering the foregoing general remarks to the exhibitors of the present year, the committee have to regret that, except in the instance hereafter to be particularly mentioned, they were without any such communication from the owners of the stock as would enable them to make a discrimination in reference to the qualities of the animals submitted to their inspection. In appearance the display of fine cattle in the class of Short-horns was altogether unprecedented, both in number and quality, by any former show of this society. The committee found on the books of the secretary, and in the pens, twenty-three individuals of different sex and ages.

Mr. Tainter's cow "Cara" was in color a light roan, of good size and perfect symmetry in form and proportion—indeed, a most beautiful animal. She was bred by Messrs. A. and A. Clark, of Granby, Mass., and was five years old on the 24th of June last. Her pedigree is traced by Mr. Tainter, through thorough-bred stock to old Denton and Comet, than which, as a milking breed, none is higher. Mr. Tainter certifies that the product of butter from her milk for seven days, on one trial,

was $18\frac{1}{2}$ pounds; and on a second trial, for eleven days, $26\frac{1}{2}$ pounds. Her average yield of milk per day, in the month of June, was $23\frac{23}{30}$ quarts, beer measure; the largest yield in any one day being $26\frac{1}{8}$ quarts. She was kept mostly on fresh grass, fed to her in the barn as soon as mowed, except on rainy days, when her feed was cut hay sprinkled with water, with which was mixed about three quarts of flax-seed meal. She was daily turned into a small lot for exercise, and it was particularly noticed that she gave more milk in fair weather, on fresh-mown grass alone, than when kept on cut hay and meal, although well moistened.

The grade cows belonging to the hospital, and exhibited in the pens, were among the noblest looking animals at the show, and the society should feel greatly indebted to Dr. Bemis, the enlightened and liberal-minded superintendent of that institution, as to the Hon. Stephen Salisbury, Mr. Brooks, Jr., and indeed all the other contributors in this department of the exhibition, for the interest given by them to the occasion.

LEVI LINCOLN, *Chairman.*

Letter of Mr. Howard to the Chairman of the Committee.

BOSTON, October 19, 1859.

Hon. LEVI LINCOLN:—Dear Sir,—I will now endeavor to reply, in part, to your inquiries. In regard to the question, What is the difference between the Short-horns and the Improved Short-horns, I remark that, as the terms are often used in England at this time, there is no difference, both being applied to the same variety of cattle. Formerly, however, there was a great difference, as will appear by reference to the history of the cattle referred to.

The term Short-horn originally comprehended (and does now really comprehend) a breed of cattle in which there is much diversity of character. So far as regards their presence in England, the best authorities consider them to have been introduced from the Continent, and hence they were for a long time known as "the Dutch breed." They occupied principally the counties of York and Durham. In the valley of the Tees, which separates these two counties, they in process of time assumed considerable superiority over the Short-horns in

general, and became known as "the Teeswater breed." The Teeswater cattle were celebrated for the quantity of milk (of rather inferior quality) yielded by the cows, and for the great weight they were capable of attaining when fully matured. In regard to fattening tendency and quality of flesh, they exhibited decided improvement, though still somewhat liable to be heavy in offal, and slow feeders, producing an inferior quality of beef.

Such may be said to have been the character of the Teeswater Short-horns, when, towards the close of the last century, they were adopted by the brothers Colling, whose herds obtained great notoriety, and with others of similar blood gave rise to a stock to which was applied the name of "Improved Short-horns." From some of the leading breeders residing in Durham, it was sometimes called "the Durham breed."

It may now be asked, in what the alleged improvement of these cattle consisted; for we are told by the principal historian of the Short-horns—Berry—that "whatever had been the merits of the Teeswater cattle, it is certain Mr. Charles Colling greatly improved them." [Rev. H. H. Berry's account of the Short-horns, in Youatt's Treatise on Cattle, p. 228.]

A few extracts will throw light on this question. Mr. Berry himself in his pamphlet on "Improved Short-horns and their Pretensions," published in 1824, speaking of Charles Colling's "rule of proceeding," says: "His constant aim was to combine the greatest inclination to fatten with the most correct form." [Page 25.]

John Rooke, a contemporary of Colling, in a communication to the London Farmer's Journal, June 2, 1821, says: "Use or profit was his [Colling's] constant aim; but the procurement of it was directed to obtaining the greatest value of carcass alone for the food consumed. Had milk and carcass combined formed the basis of his selections, it may not be too much to say he would never have obtained that early maturity, excellent quality of flesh, aptitude to fatten, and perfect symmetry, by which his bull Comet was so pre-eminently distinguished."

This language sufficiently shows what was Charles Colling's object, and what the improvement which he effected. It was the earlier maturity of the Short-horns, greater weight in proportion to offal and food consumed, and better quality of flesh

as compared with the old, or Teeswater breed. But after the dispersion of the Colling herds, and to some extent previously, crosses were made with animals from them, whose blood thus became infused into herds partaking more of the old Teeswater character. The result was the production of a stock having a greater milking tendency than the highest bred Improved Short-horns, but with less merit as fatteners. Mr. Whitaker, of Greenholme, near Otley, upwards of thirty years ago, obtained prominence for cows giving large quantities of milk, and importations were made from this herd to this country; but of late the public taste in Short-horns in England, as well as in the greater portion of this country, has turned decidedly in favor of animals in which the beef-making property is the leading and almost absorbing characteristic. Few breeders of the present fashionable Short-horns would regard a pedigree which ran back to Mr. Whitaker's great milkers, as conferring value.

It may be recollected that the purchaser of the highest priced animals, with the exception of Comet, at Charles Colling's sale in 1810, was Major Rudd. He bought Lily at 410 guineas, Countess at 400, Peeress at 170, and the bull Petrarch at 365 guineas. Fourteen years after he became possessed of this stock, in a letter to John Hare Powell, Esq., of Philadelphia, he expressed his satisfaction with it for fattening purposes, but added, that if milk is wanted, it would be advisable to resort to the "old stock."*

Some of the bulls mentioned in your letter were bred in part from the Colling stock. This was the case of Young Denton, said to have been a grandson of Comet on both sides. Admiral ran still more into that strain. Cœlebs was said to have been begotten by a son of Comet. Holderness, or Fortunatus, as he was originally called, appears from papers in my possession received from his importer, the late Gorham Parsons, Esq., to have been bred at North Allerton, Yorkshire, and was considered of the best family of the Teeswater variety. Perhaps no other bull of the Short-horn breed has ever been introduced into the country, whose progeny from so-called Native cows,

* This letter was printed in the Transactions of the Philadelphia Agricultural Society for (I think) the year 1824, but I have not a copy at hand.

were more generally esteemed as milkers than his. He was kept in different parts of Massachusetts, even as far west as Berkshire County; also in Connecticut, where he was owned for several years, and finally, after considerable service in different parts of Oneida County, New York, died in a distillery stable at Clinton, at about twenty years of age.

It has been already remarked, that at the present time the terms Short-horn and Improved Short-horn are often applied to the same kind of stock. This has resulted from the fact that the improved variety has become so widely diffused, and so much brought to the attention of the public, that, in many instances, the word Short-horn is naturally understood to refer to them, unless some special qualification is used. The case is like that of the modern Leicester sheep. They were at first called after their originator, Bakewell, or from the name of his farm, Dishley; subsequently they were called New Leicester, to distinguish them from the old breed of the county, but as they have become more extensively known, and the old breed has declined, every body understands the term Leicester as applied to the improved kind. The term Durham, so frequently applied to the Short-horns in some parts of this country, is latterly seldom so used in England, and there does not seem to be any good reason for continuing its use here.

I beg to decline the expression of an opinion as to what breed of cows would be most profitable on the abundant pastures of your neighborhood. The question could only be settled by fair selections from different breeds, an accurate account being kept of the returns of each, and of the cost of keeping.

In the foregoing remarks, I have endeavored to be as brief as the nature of the subject permitted, and have generally confined myself to the main point of your inquiries. You are at liberty to make such disposition of this letter, as, in your opinion, will best subserve the cause of agricultural improvement, for which you have so long and so usefully labored.

SANFORD HOWARD.

WORKING OXEN.

WORCESTER.

From the Report of the Committee.

In regard to the different breeds of cattle intended to be kept for farm labor, there is undoubtedly a diversity of opinion as to which is the most profitable. This, of course, will depend somewhat on the location. In the western part of this State, and on the rich meadows in the valley of the Connecticut, where there is an abundance of rich food produced by a small amount of labor, the largest Durhams seem to be the best; as, when they are no longer wanted for labor, they can be easily fattened and turned over to the butcher to profitable account. In other localities, no doubt the Devons would prove most profitable. Being of a beautiful symmetry of form, quick, easy action, arriving at maturity early, they will unquestionably thrive well on less expensive feeding than some of the other breeds. Probably most of the farmers of Worcester County will agree that both the Durhams and Devons deserve a high rank as working oxen.

We wish to say here a few words in regard to the early training of steers. This should commence as early as they arrive at the age of eight or ten months. They should be well acquainted with wearing the yoke before they are attached to a load. The merciless use of the goad or lash, in training young steers, can not be too severely censured. With proper care and good management they may be in condition at the age of two years to well pay their keeping, so that they will no longer be an expense. Besides, oxen trained in this manner are much more valuable for work than those left to run wild until they are three or four years old.

Your committee were to-day more than ever before convinced that the raising of good steers may be made both pleasant and profitable. The cost of raising good cattle is but little, if any, more than raising poor ones. Why not, then, spend, if need be, a few dollars extra in the outset, and have cattle which, at the age of two years, will readily command ninety or one

hundred dollars a pair, instead of raising such calves as you chance to have, and, at the age of two years, sell them at forty or fifty dollars, and cheat your neighbor at that.

Believing, as we do, that in the steers of one and two years old we have the bone, sinew and muscle of the oxen which, with a little more growth and training are to turn over the tough sod and make smooth and fertile the rough and barren places on our farms, allow us again to urge the importance of raising and early training of good steers for that purpose.

GEO. H. RAYMOND, *Chairman.*

WORCESTER WEST.

From the Report on Steers.

It gives your committee pleasure to say that the performances were all in a high degree satisfactory to them and creditable to the exhibitors. Although there were but few of this class on exhibition, in their training they exceeded the expectation of the committee. The exercises of the steers were marked illustrations of the culture and discipline of which the ox is susceptible. Their evolutions out of the yoke, as well as in it, were performed with almost military precision and regularity. So gratifying were they all that the committee were not without doubts in forming their judgment as to their relative merits. The scarcity of entries is undoubtedly owing to the fact that at no previous fair has this society had a committee for this class of animals. If it is the office of agricultural science to bring to the aid of the husbandman all the helps within its reach to enable him more effectually to develop the latent wealth of the soil, it is obviously important that our domestic animals should be so trained that the application of their physical powers may be subjected as far as is possible to the superior intelligence of man. The habits of beasts as well as those of man are not only more easily formed, but more permanently rooted in the character in early life than in more mature age; and the ox is not an exception to this law. From their own experience and the information they have derived from those more practiced than themselves, the committee have no doubt but the usefulness of this valuable, and in this region indispensable animal, might in a great measure be enhanced by earlier and more

thorough discipline; and they would express the hope that on future occasions like this a greater number of competitors may appear.

N. L. Johnson, *Chairman.*

HAMPDEN.

From the Report on Trained Oxen.

There was but one pair presented for inspection, and those belonged to Alden Warner, of Springfield. They were attached to a loaded cart of about 6,000 pounds weight, which they handled with ease, both in drawing and backing, without the use of the whip. They obeyed the voice and the motion of the hand, and they would allow their feet to be handled as readily as the horse does to be shod. This is a commendable trait in the training of cattle; their fine, smooth coats showed that they knew their master's crib as well as his voice.

The directors, in offering this special premium for trained cattle, had an object in view, which, if sanctioned and carried out by the farmers, would be of the highest value and profit to themselves, and a source of pleasure to the public. Who has not been pained to see some Jehu of the whip mangling the poor, patient ox, as he goes through our streets?

If our farmers intend to keep pace with the improvements in agricultural implements, they must wake up to this subject of training their oxen; he who trains his ox so that he can do more work with less strength, is a benefactor as much as the man who makes two "spears of grass to grow, where there was but one before."

It is with pleasure we notice what is said of the boy with his three years old pet steers, at the State Fair in Maine. We trust that our young farmers in Hampden County will make a note of it, so that at our next annual farmers' festival we may see what is anticipated; that the farmers' working companion in the field, the ox, may be able to divide the honors with the trained horse. In some parts of our State there is much more care taken in the training of cattle than with us. It may not be amiss to recommend to our farmers a visit at some of the Worcester County exhibitions, and see what trained cattle are capable of performing; they seem to have a will that they will

not be outdone by any animal at the fair. As the training of cattle is committed to the hands of the farmers, may we not anticipate much progress at future exhibitions in Hampden County. See to it, that the crown which belongs to the noble ox is not given to a much less worthy competition. Farmers, we bring this subject to your doors and leave it with you, hoping to hear a good report at our next annual festival. In behalf of the directors.

THOS. J. SHEPARD.

FAT CATTLE.

ESSEX.

From the Report of the Committee on Fat Cattle.

On most of the objects for which premiums are offered, if the awards were accompanied by full reports of the grounds on which they are made, suggestions or extended remarks by the committees respecting the many points wherein success or failure is made, or improvements are to be desired, and the means by which they are attainable, the reports would be more interesting and more instructive. Our Transactions would be much more valuable, and would be preserved carefully for future, almost for daily use, by farmers. They would constitute a guide book, to which they would refer when in doubt on any of the operations of husbandry.

As to fat cattle there is a diversity of opinion as to the qualities that render them desirable or marketable. We have often been amused to witness the feelings and hear the expressions of competitors for the premiums of this kind of stock at our shows, making themselves appear very ignorant or very selfish, and unless the first premium is awarded them, complaining that great injustice is done, or the committee are not judges. Although this is not the region perhaps for raising stock, particularly beef animals, for profit, still what we do have should be of the right kind—that which is always sought after in the market by first class butchers, easily and readily sold at the

highest prices. The ox that will give the greatest weight of "good pieces" according to the whole weight; that is of small bone, straight, broad back for rib roast, sirloin, roast and steak, large, full rump—for these are the pieces on which the butcher makes his money, and which give his customers satisfaction—is the animal that with good keeping will always be in good order, generally fat enough for the shambles, and the cheaper kept. There is another kind of oxen, rawny, coarse, slab-sided animals, which with extra keeping make fat cattle, and they will show large flanks and cod, sure indications of fat; but this kind are bought by butchers who barrel or pack beef, and they answer every purpose, for they fill the barrel fast, can be bought a dollar or two per cwt. less, and when headed up no one can see but that he is buying clear beef or half bone, and it is just as well.

There is still another kind which are all beef, and which are never fat, although by a person unacquainted they would be selected from a drove as the fattest. I refer to a kind known as the Whitten cattle. They are not very numerous, from the fact that they are unprofitable.

As to breeds for fattening purposes, for New England we think our old native cattle are not surpassed, and in our opinion, did we take as much pains to improve our own stock, (either cows or oxen,) as we do to import, and take the same care of ours as we do of the imported animals, we could not be beat. The Devons we think well of for oxen. They are hardy and thrive well, are cheaply fatted, small boned, which makes them desirable for beef, though not as large as our Natives. The Durhams are of the right shape and the right breed for a country where grass and grain are abundant, and they can be turned into the one and the other the year round; but for us they require too high feeding, and consequently cost too much; but they are noble animals.

For fattening cattle we do not think there is any thing better than good English hay and Indian meal raised on the farm. A few turnips, and a little salt hay occasionally for a relish, will not be thrown away.

JOSEPH NEWELL, *Chairman.*

WORCESTER.

From the Report of the Committee on Fat Cattle.

Some of your committee at least, were impressed with the importance to farmers and feeders, in this county, of feeding judiciously and economically. They believe, to make it a paying, or at least a profitable business, that cattle should always be bred or bought, for feeding purposes, of good form and constitution, of a quiet disposition, and aptness to take on fat, or to be able to make most pounds of beef where it commands the highest prices, for it always costs more to make the three cent (shank and dewlap) beef than to place it on the rump and sirloin; and this can only be done by selecting good formed animals.

The practice of most of our farmers is to work moderately their oxen from three to six years old, and then turn them over to the shambles. This may easily be done on our upland farms, where little but good hay is cut.

Young oxen may do much work and continually gain in weight, until fit for slaughter, without much grain or roots. With good hay or pasturage and judicious working, an experienced feeder may gain his farm-team work at little expense.

But the farmer who overworks his oxen till they are eight or ten years old, keeping them always thin and hungry, and—because beef commands a high price, or because his cattle suddenly fail—at once takes them from the yoke and puts them to good hay and meal, expends in the first three months as much to get them into fair working order as they would bring if fatted.

Besides, in this last way of keeping, the fat and lean are not properly mixed or marbled together, and the consumer avoids it if possible. The only paying way, is to keep all working stock in good condition, always fit for the shambles as well as the yoke, and by so doing, the owner on any day can put his cattle into market when it is in most demand and at the highest price.

The difference in quality between this young meat—juicy and tender, which has always been in good condition—and that made from overworked cattle, disordered by age and bad usage, or that which, by transportation over the railroads from the

West, has contracted fever, and are offered to the butcher nearly dead from close confinement and heated and bad air, will lead the consumer never to look at the one kind so long as the other can be procured at any cost.

HARVEY DODGE, *Chairman.*

HORSES.

MIDDLESEX NORTH.

From the Report of the Committee on Draught Horses.

The horse was probably first domesticated in Egypt, about seventeen centuries B. C., from whence he soon spread into the surrounding countries of Syria and Arabia. Civilized and uncivilized men have always considered the horse a noble animal. When we read of the ancient warriors going forth to battle with their chariots and horses, snuffing the battle afar off,—or when we read of the young Alexander mounting his young and powerful Bucephalus, whom none other could mount, and subject him at once to his will, whose pulse does not receive an accelerating throb at the thought of so powerful an animal being subjected to the will of man? Who cannot see the difference between the lofty war-horse, swifter race-horse, and the slower draught-horse, which, like the old Suffolk, will drop in harness rather than give up, and the bony Rosinante of Don Quixote? Many of these things are the result of the application of the true principles of breeding, darkly evolved by that shrewd Hebrew who peeled the willow rods.

We cannot but hope that the day is near, when animals and agricultural and manufactured articles, will be brought together at our fairs, not only for the purpose of obtaining premiums, but for comparison and the exchange of opinions and experiences of producers and breeders of stock.

The subject of breeding horses, and other animals, for particular purposes—for they can be so bred—was not much attended to until after the introduction of the Godolphin Arabian into England. Its beauty of form, speed and action,

turned the thoughts of lovers of fine horses to the subject of breeding; and from that day to this, I believe the pedigree of the best breeds of horses, has been kept as carefully as that of the aristocracy. The subject is gaining the attention of breeders with us, but it seems now to be turned more to the rearing of fast horses than to the large and powerful draught horse, that should be true to its work and kind in harness.

There are many good horses with us—as there are many good men,—that have no particular pedigree, and we suppose those that received premiums were in that class. The city of Lowell, and vicinity, could show many fine and beautiful animals if it would only bring them out. May the spirit of their owners catch fire on the day of the next annual fair, and may they turn out all their steeds in one grand cavalcade, that will make the natives stare. May they resolve themselves into a committee of the whole, vote themselves a holiday turn-out, and make a grand display.

L. Butterfield.

WORCESTER.

From the Report on Roadsters.

Enough has already been written to convince us that the same care should be exercised, the same rules observed, in raising horses as in other kinds of stock. Those who raise them as a matter of profit, will find that the colts from a mare or a stallion of established reputation, for speed and endurance, uniformly command high prices.

So much interest is now taken in this branch of agriculture, that the facilities for getting the use of high-bred stallions are comparatively easy to what they were ten or fifteen years ago, and the owner of a good mare should consider well before he resorts to the services of a scrub. The draught and hack horse are as useful, perhaps, in their way as the roadster or trotter. Hack and ordinary family horses, of good disposition, and steady gait, can generally be found at all times, and there would seem to be no particular necessity of raising them for those purposes only, when, by care and attention an even chance is had of getting something more valuable by breeding from horses of good form, strength, bottom and speed.

Draught horses, for heavy work, should be bred for that purpose only. Requiring heavy frames, large bones with a proportionate quantity of muscle, the breeding stock should be selected accordingly.

Within a few years, the interest in horse exhibitions has increased to such an extent as to require our society, as well as many others, to enlarge its grounds and make a track. This has been done at a great expense, and in a manner equal to any other in the State. It would seem, therefore, that sufficient inducements should be held out to exhibitors of horses to enable them to show their stock, not only with profit to themselves, but to the society and public generally. Go where you will, the horses draw the crowd (see treasurer's report); some for excitement, perhaps, and some for useful information. There may be a spirit of degeneracy among certain portions or classes of people that attend trials of speed, amounting to a desire of gambling; and where will you not find them? Is it in the nature of the exhibition itself, or of the man? Should exhibitions of an exciting nature be put down simply because a few people attend them through misguided notions! Your committee will go no further than to say, they can see no difference, so far as the animals are concerned, between the trials of strength, docility and tractability of a pair of steers yoked to a cart heavily loaded with stones, and the speed of a horse harnessed to a light vehicle. We know very well that a horse-race has more attractions for the crowd, but are there not equal inducements in the one as in the other for the gambler?

Many of our oldest and highly-esteemed members, whose opinions and advice are entitled to the highest respect, are opposed to one of the most important features of the horse exhibition. Having no personal feelings in the matter, it would seem, they draw their conclusions from the experiences of the past, and think there is little hope of improvement for the future. Without impugning their motives, your committee sincerely hope that, without damage to their principles and long-cherished associations, they may be induced to look with favor upon what has now become an institution, which, although it may sometimes be put to a perverted use, is, in our opinion, of real benefit to the community.

Many members of the society, more interested in cattle than in horses, also look with jealous eyes upon the horse exhibition, and regard it as an innovation. From the fact that they derive their income mostly from their cattle, it may seem quite natural they should do so; but your committee express the hope they may let fall the scales from their eyes and see the matter in a different light.

Your committee have also learned, with deep regret, that a portion of the members who heretofore have used untiring efforts to render the horse show attractive, have this year endeavored to lessen the attractions of the exhibition. They think the society does not extend that willing aid which is required for a successful show. Upon their serious reflection, we hope they will see the error of their ways, and the next year, with a different spirit and renewed energies, make an exhibition of horses in all departments worthy of the society.

Divested of some of its objectionable features, which, in the opinion of your committee, can be easily done, and with a little more harmony among the different members of the society, we do not see why the horse show should not be made useful, attractive and profitable.

MARSHALL FLAGG, *Chairman.*

From the Report on Blood Mares.

In the same proportion as the horse is the noblest of the brute creation, and his services indispensable in value and character to man, in every pursuit of life, it is obvious that there should be a corresponding effort in the breeding of horses to perfect the utility and beauty of the animal in blood and breed; and as the horse is as susceptible of pleasure and pain as ourselves, and as the same laws govern his physical system as govern ours, it must be apparent to all that intelligent care and attention should be observed in developing the symmetry and usefulness of the animal.

The very common impression that any mare, however broken-down or diseased she may be, is good enough for breeding purposes, is a sad mistake, for it is a fact now beyond dispute, that all constitutional or chronic diseases of horses are as transmissible from the mare to the colt, as chronic or constitutional

diseases are from the mother to the child; the colt of a broken-winded mare is almost sure to be unsound; however well he may look, it is almost certain that a severe test of his strength or speed will expose some disease or defect which will greatly impair his value.

The committee feel constrained to say that the habit of too early bringing out horses should be discouraged; it is cruel and absurd to impose hard labor or much speed upon a young horse. Many horses which would have been valuable, had not their strength or speed been too prematurely and severely taxed, have been foundered or destroyed by the vanity or foolishness of their owners—and it is a fact worthy of notice that the great speed of many of the celebrated racers was never known or discovered until their whole system was completely developed. Childers and Eclipse did not appear until they were five years old, and there is no doubt there have been many other horses which, if they had been developed by nature in its own time and manner, that would have equalled these celebrated horses, had they not been broken down and destroyed by early endeavors to exhibit great speed.

STEPHEN P. TWISS, *Chairman.*

WORCESTER NORTH.

From the Report on Draught Horses and Mules.

Exhibitions of animal strength have always been viewed with interest by agriculturists, a class of men eminently fond of the practical and forcible. To the eye of a true farmer the working horse, whose limbs are formed for toil, is a far more desirable object than the race-horse, even though the latter be of pure blood, and able to run a four mile heat in seven minutes, or a trotter that does his mile in $2:19\frac{3}{4}$, like Flora Temple.

Throughout New England, on many small farms, one good draught horse performs all the work necessary in cultivating the land, besides drawing the family in the "one-hoss-shay." Those who wish to convey large loads to any considerable distance, find it better to use horses than oxen, though the solid strength and patient temper of the latter render them very useful for doing rough work in a rough country like ours.

Wherever the nature of the land will admit of it, we think that the horse is quite as useful an animal as the ox, and much more so upon farms where mowing machines and horse-rakes are used; and we cannot but think that a wise policy would lead our farmers to bestow more attention towards improving the breed of draught horses.

Your committee were unanimous in their opinion that horses and mules should not be entered in the same class. The only pair of mules entered were those of Dr. Jabez Fisher, which, though small, performed very well indeed; but your committee could not have felt it their duty to award them a premium had they drawn the same weight equally well with a more valuable pair of horses. At the trial, the weight drawn was two thousand pounds of stone on a drag, the distance about two hundred feet, up hill. The same load was drawn by both double and single teams. We respectfully suggest whether it would not be well for each of those who compete for a premium to choose the load and the manner in which it is to be drawn. In that case no person could complain that his team was overloaded or forced to work at a disadvantage. There were seven double teams and four single teams entered. Two only of the single teams which were entered were permitted to draw by their owners. Mr. Martin Clifford's gray horse, though not entered for a premium, drew the load with admirable steadiness and perfect ease, and is as good a draught horse as we have seen this many a day.

ALBERT S. INGALLS.

HAMPSHIRE, FRANKLIN AND HAMPDEN.

Report on Horses.

The day of the exhibition was most propitious, the grounds in excellent condition, and the number of horses entered for premiums and gate money, large enough to cover the half-mile track, and amply sufficient for a national show. There were, of course, many good horses, of no particular breed, but the majority were certainly not such as one need go far, or pay much to see. It may be pleasant to have all the horses in the county together on these occasions, but all the common ones ought to be arranged in strings like the working oxen. As

affairs are now conducted, the time of the committees is needlessly wasted, and their attention distracted, so that really fine animals are sometimes quite overlooked, and none can be subjected to a critical examination. Could a judicious selection of the best horses in each class be made, it would then be possible and very desirable for the committees, (who *ought* to be good judges of horses,) to give each one of them a fair trial, a thing of rare occurrence under the present arrangement.

In deciding upon the merits of draught horses, for instance, not only should the breed, age, soundness, size, form, and ability to move the load forward and backward, be regarded, but more attention should be given to training and temper. Let the brake be applied, and the willingness of the horse to exert his utmost strength, even when the effort to move the load is unavailing, be considered. A perfect draught horse, well broken and driven, will only show to the best advantage on what is nearly, or quite, a dead pull.

All of the large horses bred within the limits of this society are of mixed breeds, and generally coarse and long-legged, their principal recommendation as draught horses being that they are too large and clumsy for any thing else. We need greatly for use around the railroad stations, and for heavy teaming, an improved breed of draught horses. Probably the best and only successful method of procuring them would be to import a stallion and several mares of the Clydesdale, or some other suitable variety, and breed them pure, or nearly so. To expect much improvement by crossing the stallions of large breeds with native mares, would be to hope for success in contravening well-known laws of nature. To breed good animals of unusual size, the dams must be large and of the desired form.

In the examination of the breeding mare, regard is very properly paid to her colt, which is required to be exhibited by her side. The same rule ought to apply more forcibly even to stallions. The fitness of a horse for the stud depends much more upon pedigree and unseen qualities than upon his outward appearance. No horse ought to draw a premium who has not good blood in his veins, and whose stock are not on the ground by his side to show it.

The third and fourth division of horses, as classified in the premium list, are family horses, and travelling horses. Would

it not be better to say roadsters and time-trotters, or fast horses? Then let each of the roadsters be driven by one of the committee, at least twice round the track, and all his paces be shown, including the walk. A thorough investigation should also be made respecting age, breed, soundness and training.

The fast horses should be required to trot fairly inside of three minutes, and allowed to go chiefly for the amusement of the people. They are fancy articles and may be legitimately used as such, to gratify the love of the beautiful and furnish a healthful and agreeable excitement to the multitude, but they ought not to be made too conspicuous on the programme, nor have larger prizes than are offered to other classes.

To judge accurately in regard to the real merits of a horse is no easy matter. Experience is the best teacher of the art, though not a cheap one, as all are well aware, who have thus far in life been seeking, probably in vain, for the horse which comes up to their standard of perfection. The Germans say, "durch Schaden wird man klug," "by damage one grows wise," and never is this more emphatically true, than when men deal in horses. Nevertheless, however badly cheated, they may always console themselves with the reflection that they have learned a new lesson in horse-history and acquired some additional information respecting both the desirable and undesirable points of the animal. If the first purchase is a beauty, but proves utterly worthless because he cannot breathe and travel at the same time, in consequence of a lung difficulty, the buyer will be careful next time and get one which, if not so handsome, has excellent lungs, but he will doubtless find, alas! that he has travelled too much, and the next morning can hardly hobble from his stall. The third will certainly not have the heaves, nor be foundered, but will probably have fits, and so the lover of horses goes on, increasing in wisdom, decreasing in wealth. It is true it does not add greatly to a man's reputation for sobriety or morality to change horses often, or to own and drive a good one. But not all have learned that it is wrong for one man to exchange a horse that does not suit him, for one that does, while it is right for his pharasaical neighbor to buy and sell stocks and bonds, houses and lands, cattle and sheep, ad libitum. Neither is it evident to all, in this age of steam and lightning, that the censorious individual above mentioned

does exactly the fair thing, always to ride on express trains if possible, risking life, limb and property, and causing by his reckless haste a tremendous waste of rails, cars and engines, and then hold up his hands in pious horror because another person chooses to ride ten miles an hour behind his own horse, which from natural ability and superior care, is better qualified to perform the task than his neglected beast is to go the five which he requires in the same time. We all know that what one horse cannot possibly do, is done with the greatest ease by another, just as the muscular effort which will kill a weak man, is mere play for a strong one.

Many persons seem to imagine that because their animals cannot travel rapidly without distress, therefore all fast trotting horses, and especially those trained upon a track, are subjected to great abuse. This is a mistake, and with the single exception of long races (against the useless barbarity of which too much cannot be said) there is no more required of the match trotter than is constantly required of thousands of other horses. Which is the severer task, to trot with a light weight on a smooth track, for three or even fifteen minutes once a day, or to drag a heavily laden car, or coach, or omnibus, over a rough road, or slippery pavement, for several hours of the twenty-four? Is it more distressing to exert every muscle in a natural way, as a wild horse would delight to do, for a short trial of speed, than to tug and haul through the live-long day at a heavy load, which cannot possibly be moved at any other than a snail's pace?

But not only is the work of the trotter much easier and more agreeable than that of most other horses, but his treatment is infinitely superior. Why, there are very few men who fare as well as Ethan Allen or Flora Temple! Is he the merciful man, who grudgingly doles out to his poor beast just that amount of hay and meal which will keep him in decent working order,—never gives him the luxury of a cleaning, because he is not used to it—nor a blanket in winter, for fear he will take cold—nor yet a bed, because his owner does not happen to raise straw,—or is it rather the one who keeps his horse in perfect condition, without regard to expense? He surely is the merciful man who puts the whip into the manger, and not on to the horse. The trotter who is in such condition

that it takes four men to get him into the shafts, and a stout and skilful driver to steer, not to speak of holding him, gives indisputable evidence of good treatment. He has enjoyed a bed of sweet straw in a quiet, well-ventilated, capacious stable; he has been cleaned morning and evening till not a particle of dust or a loose hair could be found upon him, and suitably clothed according to the season; he has had regular and abundant exercise at proper hours, and has had food and drink given him, of the best quality, of suitable variety, at the right time, and in the right quantity, and therefore he is alive all over and all day.

Let no man advocate any of the terrible evils which seem inseparable from the race-course, nor say one word in favor of horse-racing gamblers; neither let any one voluntarily remain in ignorance respecting the horse, because they are wise, nor reject valuable knowledge, though derived from their experience, relating to the improvement and the proper treatment of this, the noblest and the most useful of the animal creation.

It is quite unnecessary here to repeat the praises of the horse, or to show how indispensable his services have been to man in all ages of the world, and in all the circumstances both of peace and war. That man is greatly to be pitied, who can honestly say, "I care nothing for a horse;" who has no appreciation of the almost human intelligence, the unflinching spirit, the majestic beauty, and the marvellous power and fleetness of a superb horse. Still such may find an apology in the fact, that perhaps they never had any acquaintance with a really fine, intelligent, capable animal. It is indeed impossible for many to become the owners of such, even at any price, since the demand is tenfold greater than the supply.

The great want of the whole country is better horses at a more reasonable rate. A really good roadster, capable of making ten miles an hour under favorable circumstances, young, sound, well-trained, and withal somewhat stylish, is very difficult to find, and generally when found, not for sale. Now there is nothing to prevent the production of such horses to any required extent, but it cannot be done without a corresponding expenditure of labor and money. Intelligent

efforts must be made to procure and perpetuate a breed of compact, spirited, fleet travelling horses. But perhaps some one will say we have a breed; look at our splendid Morgans. Indeed! and what are the facts? Why, that we being the only people in the world who drive large numbers of horses singly, to light wagons, ought to have by far the best breed of roadsters, and that we do have some individual specimens which cannot be surpassed. But these are accidental exceptions, and like our best native cows, are not an established breed, and cannot therefore be reproduced. Our breeds are such only in name. Every chunk of a horse with a little pony smartness, and a heavy mane and tail, is a full-blooded Morgan, and if of a chestnut color, Green Mountain Morgan. Every good black horse is called a Black Hawk, though he might with equal propriety be styled a black crow. Every long-legged, rangy gray is of Messenger blood, and the rest are Hambletonian, Abdallah, or something else. We Yankees are never short for names; we have grandiloquent titles for our smart men, and illustrious pedigrees for our smart horses.

We can never breed horses with any certainty of success, until we begin as we have with our cattle, and import such varieties as have possessed for many generations those qualities in which our horses are most deficient.

The limits of this report will not permit a thorough discussion of this subject, but this much is certain, that the deficiency of our present breed as roadsters is not better color, nor form, nor size, nor gait, but what is vastly more important than these, viz.: spirit, courage, life, the disposition and the ability to do and to endure. To obtain this, we must cross judiciously with the English blood horse, so long and so purely bred as to deserve the name thorough-bred. More than one thousand of these horses have been imported into this country, but very few into New England, and most of them have been selected and kept for racing purposes. Nevertheless, nearly all of our best horses contain some of this blood, and many of our fastest trotters have been half or three-quarters thorough-bred.

But again, if we would have better horses, we must not only have the right breed, but we must give them better care when young. In England the thorough-bred colt gets his oats every

day from the time he will eat them, and consequently comes forward so rapidly that he is put to racing at two years of age. In no respect do American farmers make a greater mistake than in withholding an abundance of the most nutritious food from their growing stock, of whatever kind, as if their chief object were to dwarf all the vital organs and reduce to its minimum the digestive power, when they ought to assist nature every way towards a speedy development of the perfect, full-sized, vigorous animal.

Finally, we must have better educated horses. It is no longer necessary, and therefore it is wrong to use vicious, unmanageable, dangerous animals, since it has been abundantly demonstrated that every young horse may be so perfectly subdued and so nicely trained as to perform, up to the extent of his ability, exactly what an intelligent and reasonable driver may demand. How greatly would the sum total of human happiness and comfort, to say nothing of safety, be increased, if our horses were only free from those troublesome and often alarming tricks, which are the result either of their ignorance or their insubordination.

One horse is almost perfect, but he pulls away when hitched with any thing less than a cable; another is very smart and kind while you have hold of him, but if left for a moment to himself, springs into a gallop and leaves you alone; this horse runs away if his tail gets over the line, which it is very apt to do, and that one, if any thing touches his hind legs; here is one of the very best, but goes when and where he chooses; and closely related to him is another, all right if you can only manage to tumble into the wagon before he starts; this one kicks, that ones bites, and another strikes with his fore feet. One is rendered unmanageable by the sound of a gun, or steam whistle, or band of music, and another is terribly afraid of a locomotive, or train of cars, or even of a railroad track; some will shy at a stone, or a stump, or a white cow, or a bit of paper, and others at a stage-coach, or a loaded wagon, or a wheelbarrow; one fears a robe, another an umbrella, and another his own shadow, and so on and so forth. Now where is the fortunate individual who owns a horse of any spirit, and without one or more of these tricks; and yet almost every colt may be broken, in one month's time, so as to be free from every one

of them, and that without any more use of the whip than is barely necessary to command his attention.

Of course this can only be accomplished by means of that wonderful system which has been recently devised, practiced and taught by the Rarey Brothers. They have happily fared better than most reformers and inventors, and have not only met with the most unqualified success in its introduction, but have made it the stepping-stone to a fortune. Future generations will do them more honor than the present, and the time is not distant when this system, based upon rational principles, with the great law of kindness as its chief corner-stone, will be universally adopted among civilized nations.

W. S. Clark, *Reporter.*

From the Report on Breeding Mares.

The committee would invite attention to a few suggestions respecting the breeding of horses, that we deem important.

It is a well known fact that no animal, useful or useless, unless it be man, is so liable to unsoundness as the horse.

Is there any remedy? If not, would it not be well to substitute a hardier animal in his place, even if it were a mule?

But we claim there is a remedy; that the constitution of the horse, "as we understand it," is, in its normal state, endowed with sufficient power and endurance for all practical purposes. While we allow a wide margin for ailments that result from over-working, over-feeding and under-feeding, and want of care, generally, we believe that the great predisposing cause is due to breeding from unsound stock.

It is a frequent remark with the owners of young and healthy mares, that they will not spoil their beasts by making breeders of them. But if the same animal becomes lame, or broken-winded, or broken down, the same owners will then say, "well, they will do to raise colts from!" What they say hundreds do and have done till the horse as a race has become proverbially unsound. "Like produces like," is an aphorism that has ample confirmation in the facts to which we allude, and we have the best of reason for believing that an intelligent application of the same principles in breeding from a healthier class

of animals would eventually quadruple the aggregate value of the hundred thousand horses in our Commonwealth.

Authorities are not wanting to support these views. Cole, in the American Veterinarian, says: "Among the most prominent causes of degeneracy are breeding from worthless animals, and in a hap-hazard manner. In some towns not one good horse, male or female, can be found, and yet every sorry jade has a foal, and perhaps by the most worthless horse in the place."

Youatt and Spooner say: "the Arabs have found out that which the English breeder should never forget, that the female is more concerned than the male in the excellence and value of the produce. * * * There is scarcely a disease by which either of the parents is affected, that the foal does not often inherit, or at least show a predisposition to. Even the consequences of ill usage or hard work will descend to the progeny. There has been proof upon proof that blindness, broken wind, spavin, ringbones and founder have been bequeathed to their offspring, both by the sire and the dam." In regard to raising colts from mares incapacitated for work by old age, they add: "What is the consequence? The foal exhibits an unkindliness of growth—a corresponding weakness—and there is scarcely an organ that possesses its natural and proper strength."

Herbert's Hints to Horse Keepers speaks in this wise: "We know it is commonly said by farmers, concerning some miserable, undersized, ewe-necked, cat-hammed wretch of a mare, broken winded, ringboned and spavined, 'oh, she will do to raise colts out of.' So she will. But the breeder had better, for all purposes, especially for his own pecuniary benefit, have shot her at once, for the colt will not be worth the mare's grass."

Allen on Domestic Animals, says: "such animals should be selected as most eminently possess those points which it is desired to propagate, and these they should not only exhibit in themselves, but should inherit, as far as possible, from a long line of ancestry."

Richardson says: "the infirmities of the mare are perpetuated in her wretched offspring. Breed from none but sound parents; accidents, however, are not to be regarded as unsoundness."

Further quotations are needless. These facts and principles are patent, and have been moving the upper strata for years. What now is needed, is to have the lessons and the interest "strike in," as a neighboring journal aptly expresses itself, and affect the substrata.

It may not be amiss to append a half dozen axioms.

1st. To fully insure the production of "like from like," the desired quality should be inherited, not accidental.

2d. A sire and dam each inheriting the same defects or excellences will transmit them to their progeny.

3d. The defects in one parent may be remedied by opposite qualities in the other.

4th. "Blood" is of more consequence in the sire than in the dam.

5th. "Blood stock," being more permanently established, has a greater controlling influence than mixed or impure blood.

6th. To secure the perfect development of the foal, the dam should be larger than the sire.

HIRAM BARRUS, *Chairman.*

HEEP.

WORCESTER.

From the Report of the Committee.

The profit of sheep is not the principal, but one of the principal beauties of sheep husbandry. Eight large, or ten smaller sheep are said to be equal in keeping to one cow. The average income of a lot of ten good cows, is about $40 each, $400; when well kept both summer and winter, saying nothing about accidents or bad luck. The average income of eighty sheep, being equal to ten cows, would be about as follows, to wit:—Four pounds of wool each, 320 lbs., at 40 cents per lb., $128. One hundred lambs at $4 each, $400,—total, $528; then the capital invested, $500 for the cows at $50 each, and

$320 for the sheep at $4 each, leaving a difference of $180, the interest on which is $10.80, being added to $128, makes $138.80. Then the labor of driving ten cows to and from the pasture and the milking, $50 more, making the total income of sheep above that of cows, $188.80.

The fencing for each is about the same for every ten years, while the value of their manure is nearly equal. For if that of the sheep is not so much in quantity, it is better in quality to make up the balance. The risk of life in sheep is less than cows, for it takes a large pile of dead sheep to equal one dead cow. The risk by dogs is now but little under the new dog law. Neither is the above named profit all; our old pastures are very much exhausted and worn out from constant feeding of cattle for years past. Therefore a change to sheep in part, say put sheep in one-half of your pasture for three years, or until the pasture is well manured and the brush killed out, then put them in the other half, and putting cattle where the sheep were for three years more, and so going on year after year, the cattle preparing their half for the sheep, and the sheep for the cattle, using a little plaster each year, and keeping up the fertility of the soil of a rocky pasture for years to come.

It may be said the above statement is too woolly, smells too strong of sheep, or too highly seasoned with gold dust. But let any man engage in sheep husbandry, and manage it right, he will find the above figures correct, with such exceptions as are always made to all rules. In England, $25 or $30 rent per acre is paid annually for the use of land to keep sheep upon, and money made at that, even in sending their wool to the United States, to clothe our farmers who have thousands of acres of waste land where sheep could be kept to a profit and the soil very much improved. On the Waterloo battle-field are now kept thousands of sheep taken care of by dogs, each dog having the charge of about five hundred sheep. The same kind of dogs could be trained to have the whole care of thousands and tens of thousands of sheep in this country, on the thousands of acres of land now without any fence whatever, and thereby save at home some part of the specie now paid for foreign wool and woollen goods. The value of foreign goods imported the present year, ending June 1st, 1860, is estimated, by high authority, to amount to three hundred and ninety millions of

dollars, a large part of which is for woollen and silk goods. Let our American farmers think of this, and wake up to their best interests, before the steam pressure runs too high.

CHARLES BRIGHAM, *Chairman.*

WORCESTER NORTH.

From the Report of the Committee.

Your committee on sheep, on entering upon their duties, find in all, twenty entered for their inspection; consisting of a flock of twelve, and the remainder of single or cosset sheep, all of good quality although few in number. From the smallness of the number and from observation, we feel that farmers in this vicinity entertain the idea that keeping of sheep is but a minor consideration as regards profit, some entertaining the idea that keeping sheep in the same pasture, will in time destroy the vitality of the pasture. Such is not the opinion of your committee.

We think very many of our farmers would find it for their advantage to keep a small flock of sheep; but in order to have it so, sheep like other stock, should be well cared for. First, a suitable pasture should be selected, situated upon high, warm land, well fenced, containing running water for them during the summer season. In winter they should be provided with a warm, dry fold, to which is attached a yard, which may be occupied at their will, giving them free access to pure water, which, in our opinion, sheep, as well as other stock, require. The manger should be so constructed that the fodder may conveniently be fed to them, and so as to prevent its being trodden under their feet. Fine clover hay, well-cured, we consider the best feed for them. Sheep with young lambs, for a few days at first, require careful attention. In regard to the different breeds of sheep, the committee are not prepared to say which breed, if kept pure, would be best for our community.

The committee in examining the small flock entered, could discern traces of the Merino, South Down, Leicester, Irish Smut and Native, and are of opinion that a cross in these breeds, so as to produce wool of good length and medium fineness, is better for ordinary uses than that of the finest quality; and that sheep producing this quality of wool are more hardy

and better for rearing lambs for the market, which in our opinion affords greater profit than the wool to the farmer. You will excuse me if I say a word in regard to my own experience in the matter.

I have a pasture situated near my buildings, consisting of about twenty acres, inclosed with a common stone wall with riders upon the top, and a small stream of water running through it. For the last twenty-four years I have kept in it, with my oxen and horse, a flock of from fifteen to twenty sheep each year, which have afforded as good profits as any other stock. The fence I have endeavored to put in good repair before putting them into the pasture in the spring, after which I have seldom had any trouble during the season; and instead of impoverishing the soil, it will now keep, at least, one-quarter more stock than when first owned by me, without the application of manure of any kind, except that left by the stock. The present season I have kept seventeen sheep, which brought, in the last week in March and first week in April, twenty lambs, which they have reared. The lambs I sold when three and four months old to the butcher for $3 or $4 each. The wool, after being washed and sheared from the sheep was sold in the fleece—after reserving twenty pounds for my family use—fifty-four and one-half at 38 cents per pound, amounting to $20.71, receiving as the income of the flock $100.71 in cash.

JOHN HAYWARD, *Chairman.*

PLYMOUTH.

From the Report of the Trustees.

The trustees cannot close this portion of their report without urging upon the farmers of the county the importance of greater attention to sheep husbandry than is now displayed. Our dry, brown hills look mournfully down upon us, and seem to say, "Why are we deserted? Why left to the briar, the fern, the indigo, and the whortleberry? We can supply you with the very fat of the land if you will permit us, and can clothe you with a shelter, better than the lee hillside which we afford! Let the sheep still nestle upon our bosoms, and bleat around our sides, and we will soon furnish you with milk and

with beef, which no handling will now draw from us." This is the voice of nature, which must never be disobeyed under pain of punishment. With a climate and soil well suited to sheep, in which we are told that they are subject to fewer diseases than elsewhere, nowhere are they more neglected! They may be raised with profit for the shambles, without regard to their wool. Farmers who keep them declare that sheep are the source of their greatest profit. But we are slothful husbandmen in this vineyard. If this neglect is owing to the ravages of the canine race, it is mortifying to admit that we are all ruled by the dogs. Shall our pasture lands go with us "to the dogs"? It is in the power of the farmers of Massachusetts to say that no dog shall go at large under pain of death. They have to say the word, and it will be done.

SWINE.

ESSEX.

From the Report of the Committee on Swine.

A great change seems to have taken place in regard to raising pork. Formerly almost every farmer raised more or less for the market. Large quantities of potatoes were raised, which grew almost spontaneously,) and cooked over the kitchen fire in the long winter evenings, or early in the morning, mashed up and mixed with meal, which made a palatable, and, as was then considered, a profitable fare. The time, however, soon arrived when the old fashioned fire-place was closed up, and the cast-iron fire frame or stove took its place; consequently kettles were set in some convenient place to cook the potatoes. Now the potato crop has failed and become unprofitable to feed to swine, (except the refuse ones,) and consequently the grain crop must be almost wholly depended on to make pork for the market. Salt pork is now brought in large quantities from the West to supply our market, and in cool weather fresh pork, and also live hogs are brought and slaughtered in the vicinity of our large markets to supply them with fresh provision. The question, therefore, now arises, whether pork can be profitably

raised. This depends mostly on the price of grain and pork, or the proportion they bear to each other. With a good breed of swine, with proper care and attention, pork can be raised for ten cents per pound when corn is one dollar per bushel, or that is about a fair proportion, allowing the manure for the labor. Much care should be taken, not only to select a good breed, but the animals should have comfortable accommodations and regular feeding, as they will then be more quiet; and the more quiet they are kept, the better they will thrive.

JOSEPH HOW, *Chairman.*

MIDDLESEX SOUTH.

Statement of Joseph Jennison.

I present you a report of last year's experiment in fattening swine. I have found in my limited experience that too much care cannot be taken in the selection of stock. We are assured by all good farmers, that if we would have good cattle and good horses, we are to pay attention to the *quality*, taking particular pains to get the best of the different kinds; and that if we still desire to improve upon these, we are to be careful about the quality of the animals we intend to "cross" or raise stock from. Does not the same physical law hold in reference to swine? Are not the best breeds to be procured, and such only as are of the first quality? That "a hog is a hog" is true in one sense only—temperament—and surely this is not a quality that farmers are most interested in. Not every pig in a litter should be kept—it matters not what the stock may be—for they are not equally profitable. Yet, when care is taken, a larger number are so than when no attention is paid to this physical law. My experiments have been with the Mackey-Suffolk and Mackey-Cumberland. My success is not always the same; for I have found, after selecting those which had all the good points when young, at the proper season for fattening, give them as wholesome and nutritious food as I may, in large or small quantities, they have no appetite, eat but little, sometimes not coming to the trough more than once a day. These are exceptions to the rule. But generally the *selections* prove the best; a good pig, black or white, I always keep. I place

quality before color. These general thoughts, thrown together without much order, are applicable to any breed, almost, to be found in a farmer's sty, except the land-pike, a mongrel breed that should have been extinct long ago. To return to my report: I generally select my stock a year in advance—three or four female pigs. These are kept through the fall and winter seasons upon milk, slops, apples and potatoes, so as to keep them in good growing condition. I allow each to litter in the spring, and when old enough, the pigs are taken away, and I then commence feeding. This is about the 1st of July, sometimes later. It was about the 1st of July when I commenced last year. I used corn and oats in the proportion of three to one; in all, fifty-three bushels, forty of corn and thirteen of oats. I generally feed as much as will be consumed—not too nutritious at first. An occasional sprinkling of salt in each pail, by way of seasoning, does no harm. During the summer and fall I had more or less milk, which they shared with the pigs. In cold weather I poured hot water on the meal to cook or scald it. They manifested a greater relish for it served in this way than when the same food was given raw and cold. I posted down last season the quantity and the price of the grain used. The price of corn ranged from eighty-two cents to one dollar and ten cents, averaging about one dollar. Oats varied in price from fifty to sixty cents. About fifty-five brings a fair average estimate. I shall offset feeding, care of them, &c., against their benefit in the yard.

3 Shoats, 200 lbs. each—600 lbs., at 5½ cts., . .		$33 00
40 bushels corn, at $1, ...		40 00
13 bushels oats, at 55 cts., ...		7 15
Total cost, ...		$80 15
From these I raised 19 pigs, which I sold for	$48 87	
Hogs dressed, respectively, 395, 380, 343=1,118 lbs., at 8 cts., ...	89 44	
Total receipts, ...		138 31
Net gain, ...		$58 16

POULTRY.

MIDDLESEX SOUTH.

Statement of Mrs. C. Winter.

I commenced on the first of September, 1858, with four hens, eight pullets, and one crower, being a mixture of the blue dun and native, which I think are a hardy species, not having lost one by disease for three years. They were kept inclosed about nine months of the year, were fed on a variety of food, as per account rendered, mixed with water, and fed to them night and morning, with plenty of pure water.

Cost of keeping twelve hens and one crower :—		
8 bushels corn,		$8 40
4½ bushels Indian meal,		4 70
Scraps, shorts and potatoes,		3 75
Oats, oyster shells and pepper,		1 05
		$17 90
Product of eggs and chickens :—		
116½ dozen eggs, 19 cents,	$22 58	
Chickens sold and on hand,	22 56	
		45 14
Profit,		$27 24

Statement of Miss Emma D. Moore.

I began with a flock of fourteen hens and one rooster, of a mixed breed—the silver pheasant, Poland and common fowl. They have been shut up a part of the time, having, however, the free range of the barn cellar. Their house is on the south side of the barn, where they have the benefit of the sun and air, and have constant access to pounded oyster shells.

The following is the result of six months' experiment :—	
6½ bushels oats,	$3 46
1¼ bushels small potatoes,	20
1 bushel meal,	75
	$4 41

92 dozen eggs,	$15 68	
9 chickens, 37½,	3 37	
5 chickens, 12½,	62	
		$19 67
Profit,		$15 26

WORCESTER NORTH.

Report of the Committee on Poultry.

The committee have never, on any previous occasion, witnessed a greater number, a greater variety, or better looking fowls than have been seen here to-day. Among them was the little bantam weighing one pound, the chittagong weighing ten pounds, and the noble turkey weighing thirty pounds. There were thirty-five turkeys, fourteen geese, fourteen ducks, and ninety-seven hens; in all one hundred and thirty.

Charles F. Brown, of Fitchburg, exhibited a pair of sea-bright bantams, weighing about three pounds the pair; also seven African bantams, the lot weighing only about eight pounds. Fowls of these breeds are usually small and easily kept. Their eggs are said to be larger in proportion to the size of the fowl, than the eggs of larger breeds. There was also exhibited by the same, one pair of chittagong fowls weighing eighteen and one-half pounds. They are noble fowls, and in the time of the "hen-fever," would have commanded a good price. It is claimed for them that they are good layers and determined setters, but when served for the table are not so desirable as some other fowls. Credit is due to Master Brown for the fine cages in which he exhibited these fowls.

Mr. B. F. Proctor, of Fitchburg, had some of the dorking breed that were very fine. Fowls of this breed mature rapidly, have usually a heavy body, are full in the breast, and better for the table than those of any other breed. But Mr. Proctor had not a sufficient number to entitle him to a premium. There were several Bolton grays; fowls of this breed mature slowly, are of a small size, and lay small eggs; but they are a bird of great beauty, and if fed well will, during the year, lay a large number of eggs. There were several fine fowls of the native breed. There were others that were part native, mixed with

some foreign breed. Such fowls are generally more hardy, and if judiciously crossed, are better for the farmer than those that are bred from pure foreign blood. For such fowls the committee have awarded most of their premiums.

It is known to every farmer that if fowls have their liberty, they will do some mischief during the summer season. It is also true that they will at the same time destroy grasshoppers, worms and other insects, which infest the farm and do much injury to the farmer; this is especially true of turkeys. They will often go through a field with almost as much precision as a company of soldiers, and then back and forth, until they have ranged the whole field, and destroy those insects which have fallen within their path. If the farmer should keep debt and credit with his fowls, he would often find that he was the debtor. We would say to every member of the society who has a small lot of ground at his command, keep a limited number of fowls, and keep them well. Let a hen-house be built in a warm and dry place; let it be well lighted and ventilated, furnished with nests and nest-eggs, with fresh water and every kind of food suitable for fowls, and if your fowls are what they ought to be, you have our word for it that they will pay a good dividend for the money expended.

JOHN M. HARRIS, *Chairman.*

DAIRY PRODUCTS.

ESSEX.

From the Report of the Committee.

There are few branches of husbandry in which Massachusetts has not to compete to her disadvantage with the fertile prairies of the West. Dairy products, however, are most appropriately and acceptably raised at home, and the thrifty towns of New England afford ample markets. These productions of the first quality are not so abundant as to be a drug in our markets any where. There is even a great and increasing demand for them, and this demand is of that character most encouraging to the producer. Instead of being changeable and fluctuating, it is

very steady and constant, and great reward is extended to those who become adepts in all the arts connected with the Dairy.

The farmer of modern times is required to study other things beside the mere manipulations of the farm; he must know the phase of the markets as much as any trader or merchant, and he who is indifferent and uninquiring in this respect is ousted, as far as markets are concerned, and his neighbor, who is more active and business-like, supersedes him.

There is room for a much greater extension of this department of husbandry in our own county. It appears from the papers submitted to the committee, that a variety of methods were adopted in the making of the butter offered for premiums; and no less various, certainly, were the results attained.

There can be no question that the expression of the buttermilk is a very important part of the process, and upon the thoroughness with which this is accomplished depends in a great measure the quality of the butter. This should be done at once, if possible, and as soon as may be, instead of allowing the butter to remain over night with only a washing with cold water, and a whole day longer, before the last effort is made to express the milk, as was one of the methods adopted. It was the opinion of the committee that the general quality of the butter was not remarkably fine, which is not to be wondered at when complaints have arisen on all sides during the summer months that unusual precautions were necessary to obtain superior butter.

G. P. Sargent, *Chairman.*

WORCESTER WEST.

From the Report of the Committee on Cheese.

The production of cheese is not only an agricultural but a manufacturing operation requiring great skill and nice attention to all its details to insure success; and upon it depends the results of much of our farm labor. This is the laboring point; a failure here is disaster to the whole establishment. The toil of the hay field and the various labor of the farm must lose its reward or be but scantily remunerated, if the operations in the cheese tub are not performed with skill and intelligence.

The reputation of this part of the country for the manufacture of cheese is a great public interest. New Braintree and

Barre cheese has a character, if we may so speak, that affects its value in the market to a great extent, and no doubt cheese from this vicinity, or with the name even of Barre cheese, sells higher in the market on that account.

Now as we have said, this reputation is public property of great value, and ought to be cared for and increased by public and private effort.

Deservedly high as this reputation stands, it is not what it ought to be, and what it should be made to be. For be it understood, this reputation is not that of the best dairies of New Braintree, but that of an average of all the cheese made in this part of the country and sent to market as cheese from Worcester West. What then would be its name and its fame if the standard of its excellence was that of the best cheese offered here for premium to-day? What an increased value would it give to the whole production.

It is a fact well known by our merchants and cheese dealers, that the good has to help sell the bad, so that in fact every cheese producer is interested in the production of every other individual with whose product his own may be associated in the market. What then can be done to improve the general quality of cheese in the towns associated in this society? Your committee are sorry they have not the time or ability to present a dissertation on the art of cheese making, which would be valuable to the public. Such a treatise must come, if needed, from abler hands.

One thing needed in the community, is a proper standard of excellence in cheese. Many who manufacture cheese largely do not know what constitutes a good article. They are acquainted only with their own production, and do not know but what the general shape and color of a cheese is all that is necessary in its manufacture. On this point, your committee would suggest whether it might not be well for the society to purchase and distribute at the table or in the hall of exhibition specimens of the cheese considered worthy of premium, and thus furnish a standard, or what is a standard in the opinion of your committee, of good cheese.

With this information, it would seem that every one interested would be led to inquire what they do, or what they neglect to do, that varies their cheese from this standard.

FREEMAN WALKER, *Chairman.*

WORCESTER NORTH.

Statement of S. M. Caswell.

Butter.—The milk is strained into tin pans, filling them about half full; when the weather is cool it is set in the milk-room, on racks, with the bars about ten inches apart, set corner-wise, thus giving a free circulation of air to the whole bottom surface of the pan, which greatly facilitates the cooling of the milk and rising of the cream. When the weather is warm, it is set in the cellar, on a hard, smooth bottom, which is kept cool and clean by occasionally pouring on cold water, and sweeping thoroughly. After the milk is set, we let it remain from thirty-six to forty-eight hours, according to the temperature of the weather; the cream is then taken off and put in tin pails, and kept in a cool place until a sufficient quantity is gathered for churning, which is usually three times a week, during the summer, when the cows are in full milk; especial care being always taken not to let the cream remain on the milk after it begins to sour, which, together with churning the cream while sweet, I consider one of the great secrets of good butter making; for, the sweeter the cream when churned, the sweeter will be the butter, and the richer the flavor. After the butter is churned, the butter-milk is well worked out as it is taken from the churn, it is then salted with from three-fourths to one ounce of salt to the pound, according to the strength of the salt; it is then set in a cool place until the next day, when it is again well worked over and lumped for the market. In conclusion, allow me to say that I consider the grand secret of good butter making to consist principally in three things, first, good cows; second, good sweet feed; third, last but not least, a woman who will take good care of the milk, and make the butter.

PLYMOUTH.

From the Report of the Committee.

There were twenty-five samples of butter offered for the society's premiums. In flavor, color and form, all, with one exception, were deserving of high commendation, and so nearly equal to each other in excellence, that the committee found it

no easy matter to select eight, the number of premiums offered, which should unquestionably surpass the rest in all the qualities essential to good butter, and then to determine the relative value of these specimens.

The samples of cheese, fifteen in number, were also highly creditable to the producers, and would compare favorably with the finest products of the best cheese districts in the country. This is particularly remarkable, as the subject of cheese making has received but little attention from the farmers of our county, for the reason that they have found it more profitable to sell milk or manufacture butter.

It is to be presumed that those who have succeeded in making good cheese or butter, have information to impart which it is important for others to know. On this account, the society very justly requires that a statement detailing the mode of manufacture, shall accompany each article offered for premium. Now, if these statements are to be of any use, they must contain something more than the rudest outlines of the process by which the article has been made; they must give, as far as possible, a minute account of each step in the procedure. Two of the competitors made the following statements:—

"Set milk twenty-four to thirty-six hours. Salt with rock salt, one ounce to the pound."

"This butter was churned in the old-fashioned churn, and the butter was washed out, salted to suit the taste."

The other statements were more full than the above, but only one of them stated the kind of churn used, which was a stone one; not one the time of making butter, success in winter or summer, best feed for butter or for cheese, the feed of the cows from which the same were produced, and none of the more doubtful points upon which the experience and success of the dairy women must have given them decided opinions and valuable knowledge. From their various statements we gather the following particulars, which we are inclined to think of value; that the milk is strained when warm from the cow through a linen cloth, set in well scalded pans, two inches deep; placed in a cool and dry place in summer, with all eatables excluded, but not so airy as to disturb the cream; the cream is skimmed before the milk is

soured, and churned before the cream is sour; when skimmed and placed in the pot with other cream, well stirred to prevent white specks and streaks in the butter; worked with clap sticks or ladles, salted with four ounces of salt to five pounds of butter, and after standing in a cool place covered from the air twenty-four hours, again worked with clap sticks; this process repeated, and the butter kept covered with a cloth, and preserved from the air, or placed in stone jars covered closely.

One of the competitors skims his milk twice a day; another uses Thatcher's clarified salt, and a third works three times and adds salt each time. The amount of salt recommended varies from four ounces to five pounds, to one and one-quarter ounces to a pound.

In the manufacture of butter, where the conditions are so complicated and variable, much must be left to the judgment of the producer; but this is no reason why statements accompanying samples of butter offered for premium should leave every thing to the judgment, and give no information which is not already well known to all who have had any experience in the matter. It is with much regret that the committee find themselves unable to speak in very high terms of the usefulness of the statements which accompany the samples of butter submitted for their examination. They comply with the letter, but not the spirit, of the society's requirements. They fail to give that information which would enable all who have good judgment and are favorably situated, to make good butter. The business of butter making is too generally a hap-hazard affair; and the best way to disseminate the knowledge necessary to establish some degree of scientific accuracy where accident seems to reign, is by means of detailed reports of those who offer their products for premium.

In order to aid, if possible, in attaining that completeness which is so desirable in the statements of those who excel in making good butter, and who undertake to make their art intelligible to others less skilled, the committee beg leave to make some suggestions as to the points which should occupy the attention of the butter maker.

Composition of Cream.—Cream does not consist wholly of the fatty matter of milk, but also of a variable proportion of curd or cheesy matter, and a small quantity of milk sugar. It is owing to the presence of this cheesy matter and sugar that butter becomes rancid. Hence the importance of knowing the conditions under which the milk must be placed, in order that the cream may rise as free as possible from these deleterious ingredients. The proportion of cheesy matter in cream depends in a great measure on the temperature at which the milk is kept during the rising of the cream. In cool weather the fatty matter brings up with it more of the curd; and consequently butter made of such cream cannot be the best. It is the practice of some to warm their milk-rooms in winter, in order to facilitate the rising of the butter particles, and keeping them free from cheesy matter. Others, to avoid the expense of heating the milk-room, place the milk in tin pans on a stove till the cream has risen, being careful not to allow it to boil. By this method the amount of cream is greatly increased in cold weather, and it is much more readily changed into butter than when the cream is allowed to rise without artificial aid. Warm water will produce nearly the same effect; the quality of the butter, however, is slightly deteriorated.

Churning.—There are two modes of practice with regard to the process of churning, each of which has its advocates. The whole milk may be churned, or the cream only. When the entire milk is churned, the temperature of the milk, when the churning commences, ought to be 65°; cream ought not to be warmer than 55°. In colder weather it is often necessary to add hot water to the cream to raise it to 55°. But in hot weather it is difficult to keep the cream down to this comparatively low temperature; and if churned in this cool state, only a second rate butter can be obtained. Those who prefer using the entire milk, claim for their process many advantages. The proper temperature can be easily obtained, both in winter and summer. More butter can be got from the same quantity of milk. Butter of the best quality can be obtained without difficulty in winter and summer. The butter is not only of the best quality while fresh, but is also best for long keeping. The time occupied in churning

seems in general practice, to be entirely unsettled. Yet it cannot be denied that it is an important element in making good butter. It varies from five minutes to three hours. It is desirable to have some accurate experiments to determine this point.

Various Circumstances which affect the Quality of Butter.—Butter produced in one district differs often in quality from that produced in another, even though the same method of manufacture be adopted. In different seasons, also, the same farm will produce different qualities of butter. When cows are pastured the most delicious butter is obtained in May and June. It is the hardest when the animal lives on dry food. Autumn butter is best for long keeping. The constitution of the animal also is known to affect the quality of the butter, for there are some cows which, with the best food, never yield first rate butter. But from the same milk, and even from the same cream, very different qualities of butter may be obtained. If the milk be divided into two portions, that which is last drawn from the cow is the richer. The first cream that rises on any milk is always the richest, and makes the finest flavored butter. It is quite important to determine by experiment, whether it would pay to separate the milk into various portions, for the purpose of making a superior and an inferior quality of butter.

Preservation of Butter.—The rancidity of butter is caused by the action of the cheesy matter on the milk sugar and the fat. This is further increased by the influence of the oxygen of the atmosphere. In the manufacture of butter, therefore, it is important to free it as completely as possible from the curd and sugar of milk. This is effected in two ways, by kneading and pressing, and by washing the butter in cold water, until the milky substance disappears. When butter is to be kept a long time, it may not be well to adopt the method of washing which is expressly stated, as the custom of all the competitors but one. The water may contain impurities of various kinds, which the butter is sure to extract, and thereby become rancid. The washing process, also, exposes the particles of the butter too much to the atmosphere. It is indispensably necessary to the preservation of butter for any length of time, to exclude the air from

it as completely as possible. The sooner the salt is applied, and all packed close, the better. The deleterious effect of the cheesy matter is in part prevented by the presence of common salt. The salt should be as pure as possible, as free, at least, from lime and magnesia as it can be obtained. It is quite easy to purify common salt from these impurities by pouring a couple of quarts of boiling water on twenty pounds of salt, stirring the whole occasionally for a couple of hours, and afterwards straining it through a cloth. Salt so prepared will be found much more effectual in the preservation of butter.

It is hoped that these and many other points connected with the manufacture of superior butter will receive the attention of those who may hereafter offer their butter for the premiums of the society.

CHARLES BURTON, *Chairman.*

FRUITS.

ESSEX.

From the Report of the Committee.

We were asked at the hall, why, in our premium list, preference was given to pears grown upon their own root, rather than upon the quince. We would say in reply, that the quince root cannot be depended on for many years—that bearing earlier than upon its own root, brings it to an early termination; it rarely lasts more than ten years, but occasionally it flourishes and is productive for twenty years. We therefore recommend for orchard culture, and for permanent crops, the pear stock. Under favorable circumstances this tree is long-lived. The Endicott pear tree, still in a bearing state at North Danvers, was imported from England by Governor Endicott, in 1628. The French pear trees, (so called,) that line the borders of the river at Detroit, are said to be nearly a century in age, and are still in a bearing state. Hence we have in our premium list given preference to those grown upon the pear root, and we

would suggest to the trustees the propriety of confining premiums to these alone, giving gratuities simply to those grown as dwarfs; and as we wish to encourage the growing of the pear upon its own root rather than upon the quince—the last belonging to the small garden of the amateur rather than to the orchardist—we would again commend these suggestions to the trustees. It is often asked, "why pear trees do not flourish equally well in every locality?" This we would say has been attributed by some to their proximity to the ocean. But we do not apprehend this to be the cause; on the contrary, it is probably owing to the want of proper soil first, and also in applying too much animal manure not composted. Regarding the proper soil for fruit trees, our practice has been for many years to follow nature in her mode of enriching the soil; or, in other words, use vegetable manure more generally by the application of leaves in compost with wood ashes, peat, and shell lime.

The supposed influence of climate or locality on certain pears, as said by Downing in his book of fruits, he could not sustain, and hence a few years after he gave up this theory, and said: "That a larger observation of the effect of the composition of soils convinced us that much of what we attributed to climate was simply owing to a want of inorganic or mineral manures in the soil." Another objection we have to the use of unfermented animal manure, is that it stimulates, and as a consequence of this over-supply, induces a sort of plethora or tenderness in the tree, from a too rapid and forced growth. We prefer to see a moderate and regular growth; hence we believe that good pasture land is better fitted for fruit trees than that which has been long under the plough, because it is not exhausted of that decomposed vegetable and mineral matter which is well fitted to be the food of trees, the wood also ripening better. We have long observed that young trees, particularly the cherry, if making a great growth in the summer, was extremely apt to die out the following winter, owing undoubtedly to its succulent growth and want of ripeness in the new wood.

Pear Culture.—There is no fruit cultivated that is so variable in different localities in growth and fruit as the pear. It would seem that, with the exception of the Bartlett, (which

assimilates itself to various soils,) there is scarcely one of the fine sorts that does equally well with all cultivators, some requiring a rather cool and retentive soil, others a warm, sandy loam. There are also many pears with regard to which it is difficult to know what peculiar element is wanted for successful growth; for example, the Dix, which cracks or blasts in many soils. On some land the fruit of the Napoleon and St. Ghislain is astringent. The analysis of soils which has been made from time to time, has never as yet given us any thing reliable on this matter, and we are inclined to think, with Professor Mapes, that "the laboratory and the microscope are both incapable, as yet, of ascertaining why two substances, containing the same constituents in precisely the same relative proportions, should so widely differ in their functions that one will fertilize a plant, and the other will not; that one can be absorbed by organisms, both vegetable and animal, while the other cannot."* In order therefore to have good fruit from the fine varieties, more attention should be given to ascertain, if possible, what varieties do best in our own soil, and to cultivate for a principal crop those only. This we apprehend to be now the great desideratum in the culture of this fine fruit. Many individuals are inclined to possess a great number of varieties irrespective of the soil in which they place them, and in consequence of this we rarely, if ever, meet with an orchard of pears that, as a whole, is remunerative to the owner. If a cultivator should have in his grounds the four varieties of winter pears—the Beurré d'Aremburg, Winter Nelis, Lawrence, and Lewis, and he should find that any of these had done well for a series of years, those only should be multiplied, and the same course should be pursued with the summer and fall varieties.

Grapes.—As to the oft-repeated question—"What are the best varieties of grapes for out-door culture, and whether there are any among the numerous varieties now offered for sale superior for general cultivation, and that will ripen in this county earlier than the Isabella, Diana, or Concord?" this is a question difficult to answer, unless we now have them in the new hybrids, exhibited at our last show by E. S. Rogers, of Salem, among which were at least two varieties, superior, in

* Working Farmer for June, 1859.

many respects, to those we have heretofore grown in open air. These new grapes have for their parent on one side, one of the largest, earliest, and hardiest of our native grapes—the Mammoth; on the other, two of the best foreign sorts,—the Black Hamburg and White Sweet Water. These seedlings seem to combine the hardiness of the one, while the fruit partakes of the flavor of the other. Among the varieties exhibited, we will only specify a few of the best and earliest.

No. 3 was the earliest, the fruit in size and color resembling the Diana, but earlier in ripening—of a sweet flavor.

No. 13 was a grape of a red color, and of a peculiar aromatic flavor.

No. 5. This was said to be from the Sweet Water and Mammoth combined, very sweet fruit, and size of the Chaselas.

No. 15. This sort, we were informed by Mr. Rogers, is considered by many to be one of the best grapes in the collection—producing fruit of a rich and high flavor, color red.

No. 33. The specimens shown of this number were not equal to the high character attributed to it, as being equal to the Black Hamburg, which it closely resembles in appearance.

No. 19. This large, early grape, of the size and color of the Black Hamburg, we thought to be the finest variety shown, the bunches and fruit large and compact, a strong grower, and said by Mr. Rogers to be perfectly hardy. Among some half a dozen of his varieties which we set last spring, No. 19 has made as much wood as all the others combined. We cannot but consider this sort to be an aquisition for this locality, where the Isabella and Diana are apt to fail. It is said to have ripened its whole crop perfectly since the first year of its bearing, which was the first week in September, and has continued to improve in size and quality.

J. M. Ives, *Chairman.*

ESSEX.

PLAN FOR INVESTIGATING THE POTATO DISEASE.

BY WILSON FLAGG.

It is about fifteen years since the first general appearance of the potato disease. During this time the whole civilized world has been investigating its causes, its nature and its remedy. This disease is marked on its first approach by a slight discoloration of the surface of the tuber, gradually penetrating its substance, and causing a hardness of the pulp most apparent after the potato is cooked. This hardness bears some resemblance to that of a tuber of the preceding year's growth, which is sometimes found in the hill among the new potatoes. No amount of boiling will soften either the one or the other; though they will yield to a greater degree of heat than 212° in an oven, and become softened. Throughout the diseased substance there is a brownish or rusty hue, sometimes in irregular streaks, and sometimes uniformly blended with the mass. The final stage of the disease is a softening of the part, which seems to be identical with its corruption, when it is almost black. Such are the superficial appearances of the disease; its nature has not been yet ascertained. Several theories have been put forth to explain it; but they are all unsatisfactory to the reason and common sense of impartial inquirers.

Among the theories which have been advanced to explain the nature and causes of the disease, four have attracted public attention and have been warmly advocated by their respective authors. The fungus theory, which I will name first, supposes that the rot is caused by inoculation with the *spori* of a certain species of fungus, which, like a true parasite, penetrates the substance of the tuber, and thrives upon its nutritious properties. This fungus has been supposed to resemble the red rust that attacks the leaf and stem of Indian corn and other cereal plants. It is now believed to be the consequence, not the cause of the disease, being always developed subsequently to the gangrene of the tuber.

The theory put forth by Mr. Smee, an English experimenter, maintains that the disease is produced by an insect. This hypothesis has been advocated by several writers who have stated many important facts to corroborate their views. Mr. Smee found, however, that when he placed the insect that infested the unsound tuber upon one that was sound, they would not remain upon it, but left it. Hence it is to be inferred that they will not feed upon the potato unless it be in a corrupted state. It is also worthy of remark, that the different advocates of this theory have attributed it to several different species of insect. This fact lessens the probability that their suppositions are correct. Indeed, the same reasoning that has been used to controvert the fungus theory, renders it probable that the insects do not produce the disease, but they are attracted, if not generated, by the corrupt matter which is consequent upon it.

Mr. Bradford's hypothesis, which, if correct, explains the cause, rather than the nature of the disease, supposes it to be the consequence of the "running out" of the plant from the effects of old age. The tubers, he considers, not as the literal offspring of their predecessors, but as continuations of the individual from which they were originally derived; as grafts are but continuations of the parent stock, and not its literal offspring. Hence, as scions are supposed to suffer the effects of old age at the time when the original tree from which they were taken would suffer these effects, the tubers of the potato are supposed to be liable to a similar decay after an indefinite period of time.

There is some fallacy in this idea. Nature's laws respecting animal and vegetable propagation are far from being identical; and they differ in this important respect—that while animals can be propagated only by the union of the sexes, plants may be propagated both in this way and in another way which is independent of sex. The assumption, that a graft or a scion is a continuation of the tree from which it was taken, is true only in a qualified sense: it is really but a continuation of the multitude of plants sustained by the tree in one vast community, each individual of which dies annually. A tree is a family of individual and annual plants, deriving their nourishment from one common source, and supported in their position by the branches, which serve also as conveyances of nutriment to the

millions of plants assembled upon them. Each of these plants dies annually when the leaf perishes, by which it held communication with the atmosphere. Just at the point where each leaf was separated from the branch, is a bud; and this bud, together with the recent branch upon which it grows, and the other buds that grow upon it, is the offspring of its predecessor which has now perished. As this mode of propagation is maintained without the union of sexes, so it differs from the sexual mode in always continuing the sex of the plant, if it be diœcious. Herbaceous plants which are considered perennial, have the same power of multiplying themselves in other ways besides the sexual manner,—some by tubers, some by bulbs, some by buds or subterranean stems, and others by buds that separate themselves from the plant, as in the Tiger lily.

It would be difficult to prove that the Tiger lily might not be propagated, through all time, by these buds, as well as by its proper seeds. We are not authorized by any experiments, to say that plants may not continue their species by means of buds, tubers and bulbs, in perpetuity. I am inclined to believe, however, that the sexual method is the only one designed by nature to insure immortality to the species. The propagation by buds and scions, taking place without the union of sexes, must be considered as the closest kind of in and in breeding, and must be attended, at least under the artificial circumstances of culture, with some of those disastrous consequences, which are known to proceed from sexual in and in breeding.

I am not, therefore, prepared to deny that, if Mr. Bradford's theory be incorrect, there may be some truth in his conjectures. In accordance with his hypothesis, that the potato disease is but a natural decay, produced by the old age of the present varieties, as continued through many generations uninterruptedly by the tuber, the remedy, he contends, must consist in raising a new stock from the seed and rejecting all the old varieties. Yet as the seedlings of potatoes which have been long under cultivation, may partake of the infirmities of the parent, he recommends resorting to the original wild potato, and re-stocking the country by seeds procured from this source.

Similar to the foregoing theory is one advanced by Mr. Pritz, a German experimenter, who believes the disease to be the consequence of a high system of cultivation, or as I would

express the idea, of luxurious habits continued through many generations. In this way the plant has acquired a predisposition to disease, which is increased by high culture, and may be diminished by culture of an opposite character. To prove his position, he states that the disease shows itself in a more aggravated form, in proportion as the crop is highly composted, accompanied with a moist soil and atmosphere, and other conditions favorable to the luxuriant growth of the plant. These circumstances he supposes to be productive of a superfluity of water in the sap-vessels of the plant, thereby giving origin to the disease. Hence the disease commonly shows itself in the stalk before it affects the tuber; and the fungal growth which ensues, is the consequence of the corruption of the tuber.

The same injurious effects, I would add, are well known to follow long continued high manuring, both of fruit and forest trees, especially in the early stages of their growth; and there is probably a limit in all natural productions, both of the vegetable and animal kingdom, beyond which "improvement" suddenly stops, and degeneracy ensues. Hence the "running out" of established varieties of artificial fruits, and of improved breeds of domestic animals, which must occasionally be crossed with a less improved stock, to restore their vigor of constitution. As a remedy for the potato disease, Mr. Pritz recommends that the tubers be planted in a soil which is well drained, and in which the fertilizing materials have been thoroughly mixed with the soil during the previous season; and he prefers a virgin soil to one made equally rich by artificial methods.

Beside the theories above stated, various remedies and nostrums have been proposed, some of which afford rational subjects of experiment. One of these recommendations is early planting, which has been considered favorable to the production of a healthy crop. Others recommend ashes, lime, and various alkaline substances, as remedies, having observed some good effects resulting from the use of them. These and several other appliances and methods of cultivation, though they do not insure a sound and healthy crop, may be found to diminish its liability to be diseased.

We cannot reasonably feel sanguine of discovering a specific for the cure or prevention of the disease, nor of ascertaining

the remote cause of it. We may be able to guess at some of the proximate causes—such as high manuring and general luxurious treatment; (for after the predisposition to disease is created in any subject, a thousand different agents may act as proximate or exciting causes of its development,) while its remote cause still remains hidden. The potato disease probably resembles certain diseases of the animal system, whose origin is involved in mystery, whose nature is but partially understood, and whose remedies serve rather to assuage than to cure them. Such diseases may come upon an individual, in spite of the most rational employment of those measures of prevention which usually render one secure from its attacks. Still, experience has proved that the precautionary measures recommended by physicians are general safeguards; and that the disease, whatever it may be, will attack a smaller proportion of those who attend to these sanitary rules than of those who neglect them.

The same course of reasoning will apply to the potato disease. This plant, without doubt, will always be liable to its attacks; but careful inductive experiment, carried through a considerable series of years, may bring to light certain facts, upon which a system of sanitary rules may be established; and by attending to these rules in the cultivation of the potato, we may thereby obtain, on the average, more abundant and more healthy crops than we could if these rules were neglected. We may learn the different effects of a wet and a dry soil, of a new and an old soil, of a rich and a mean soil; of a warm and a cold situation, of the north and the south side of a declivity; and of many other conditions, which it is needless to enumerate, since they could be multiplied to infinity.

Many facts of important signification have already been ascertained by the experience of intelligent cultivators, showing that certain modes of tillage lessen the ravages of the infection and reduce its chances of recurrence. Each of these facts constitute one step in our progress towards the great point to be attained. Still it seems to me that this agricultural problem will be found to resemble those mathematical problems by every process of which we approximate nearer to the desired result, but can never fully read it. Though we may never ascertain the true character of the potato disease, nor learn the means by

which we may invariably defend the plant from its attacks, we may nevertheless, by carefully recording the details of a series of philosophical experiments, and by generalizing all the facts thus developed, approach so near to the end desired as to produce a potato crop with no more chances of failure than of losing an Indian corn crop by summer rains and September frosts. By the careful observation of such facts, obtained from experiments extended through a series of years, we might gather a sum of information, the value of which would more than balance the expense of conducting them.

It is a knowledge of the remedies, or preventives, of the disease, which it is desirable to seek; the nature of it is of less importance, except as a knowledge of it might point out the means of extirpating it. The wide prevalence of the disease, which occurs simultaneously in different parts of the country, and in different countries widely separated, proves that its cause is universal in its character. It does not commence in a particular district, and gradually extend over the surrounding country. Its sudden and simultaneous occurrence, as distinguished from any thing of a progressive character, proves it to be no travelling epidemic. All this favors the idea that it is a constitutional disease of the species,—whether it be the consequence of "running out," or of any more hidden and mysterious cause.

From the report of the committee of the Massachusetts legislature, "On the Diseases of Vegetation," it appears that out of a large number of communications relating to the potato disease, from individuals claiming the premium to be awarded to the person who should discover its remedy, twelve of the experiments recommended, which were alone considered worthy of being tested, were carefully tried on the State farm, but "all failed to give any such results as would entitle them in any way to the confidence of the community, or as answering the requisitions of the law." The report of this committee is an excellent specimen of philosophical reasoning, and ought to be carefully studied by those numerous individuals who can not distinguish between a principle and an hypothesis, or between a conclusion based upon assumed premises and one based upon facts. No man can be a good experimenter who has not a logical mind, though he may be the best practitioner

of his art in the world. The best practice may be empyrical, but experiment is worthless if it be not philosophical. It is the want of this logical faculty that leads so many persons to believe they have discovered the cause of a thing, when they have only discovered one of its accompaniments.

The difficulties which most men encounter when they are experimenting on any subject, are what Lord Bacon terms "the idols of the mind." An individual discovers a peculiar symptom, for example, upon the vine or the tuber of the potato plant, while it is effected with disease; and this gives rise to a conjecture, and upon this conjecture he builds a theory. He then commences a sort of special pleading for his own hypothesis, and ends in convincing himself that he has made a great discovery. His error proceeds from using his conjectures for his premises, and building his system upon them before he has established his facts. It is in this way that men are constantly deceiving themselves and the public.

This is not the way to investigate truth: it is the way which has always been used to establish error. It leads one to set aside all evidence unfavorable to his assumption, as a corrupt judge rules out of court the evidence of those witnesses who are opposed to his own designs. Many very erroneous theories have been built up by this method of establishing a position. Their advocates, however, often perform an important service to science, by stimulating others to examine the opposite side; and by their competitory reasoning and experiment, a great deal of useful information is brought to light.

The legislative committee have pursued their investigations in a true philosophical spirit, and with a full comprehension of all the difficulties of the subject. But this investigation cannot be successfully pursued by the most capable persons, unless they can be furnished with a motive to devote a great part of their time and attention to it. The best course would be to authorize the committee to select some competent individual, and offer him a pecuniary inducement to attend to a series of experiments in relation to the subject, during a certain number of years, making it his duty to superintend all the operations, note the symptoms, the beginning and the progress of the disease, and all the circumstances attending it, and make semi-annual reports.

This scheme is not proposed with any idea of discovering a certain and infallible cure for the disease. The experiments, as I have already remarked, must be expected to lead only to an approximation to the desirable end, but at the same time to open the way to the discovery of many valuable facts that bear relation to the general diseases of plants, tending thereby to promote one of the least known and most useful branches of agricultural science. In accordance with the preceding views, I present the following synopsis of a plan upon which a series of experiments might be based:—

I. The first series might be designed to ascertain whether the disease be contagious or non-contagious. If contagious, it may be communicated by planting the tuber in a soil in which a diseased crop was raised on the preceding year. It may also be communicated by the use of compost in which some of the affected tubers have been mixed. In order to ascertain whether this hypothesis be correct, we should institute the following tests.

Let a field, containing half an acre of virgin soil, be prepared and divided into two equal sections, taking care that the soil of the whole field be uniform and equally exposed to light and moisture. Fertilize one of these sections with a material containing a large mixture of diseased potatoes reduced to compost. Let the second be fertilized with a similar compost, except that it shall contain no diseased potatoes, nor any substance that is affected with the virus. Plant each section with sound potatoes of the same variety and from the same lot, after washing all the seed in some disinfecting fluid, to remove any virus that may exist on the surface of the tubers. Take pains to cut open every tuber before planting it, to see that it contain no visible marks of the disease, and reject all that do not appear to be sound.

If the crop in the first section, which was manured with a compost containing virus, be evidently more diseased than the crop in the other section, we have some presumptive evidence that the disease is contagious. A few repetitions of the same experiment, with invariably similar results, would establish the point beyond doubt. But it would still remain to be proved that there are not many other ways by which the disease might

be engendered. A communication by contagion might still be but one among a great number of exciting causes, not bearing any relation to the original cause of the disease.

II. The predisposition to disease may be hereditary. Of this there seems to be no good reason to doubt; but admitting it as a fact, may we not, by a series of careful experiments, discover the means by which it is most likely to be communicated from one crop to the succeeding one? In order to put this supposition to the test, let a field of uniform soil and situation be divided, like the foregoing, into equal parts; then select from the same kind and the same lot of potatoes, one portion entirely sound for one division, and another portion of diseased tubers to be planted in the other division. Let the ground be prepared and manured in the same way for each, and let the two crops be cultivated in exactly the same manner. The sound potatoes would probably yield the largest crop; but the object of the experiment should be to ascertain whether a diseased tuber necessarily yields a diseased product.

The preceding experiment may be modified in the following manner: Let the two sections of a field, prepared as before, be planted each with sound potatoes of the same variety; but let the seed for one section be selected from a crop which has not manifested the disease, or at least only in a very slight degree; and let the seed for the other section be also sound, but selected from a crop which was very much diseased. Take notice whether, under these circumstances, one is more affected than the other with the malady. It may turn out—though such a supposition is very improbable—that it is best to select seed potatoes from among the sound ones of a diseased crop, on the supposition that they must possess the property of resisting disease in a remarkable degree, and might communicate this power of resistance to their offspring. We know that such a principle exists in the animal constitution, to a certain extent; but this is not a problem to be solved by reasoning; it must be settled by experiment. It is important, however, to ascertain whether a crop produced by sound potatoes from a sound lot, is more likely to be exempt from the malady than one produced by equally sound potatoes from a diseased lot.

III. A third course of experiments should be designed to ascertain the effects of certain modes and materials of fertiliza-

tion, in diminishing or aggravating the malady. It is very generally believed that both high manuring and manuring with unfermented or unassimilated materials, by causing a morbid luxuriance of growth, produces an earlier appearance of the disease, and increases its ravages. This opinion is based on the general experience of cultivators, and has been proved in some instances by careful experiment. The subject is a very important one, and opens a wide field of inquiry.

The true method of instituting a course of experiments under this head must consist in selecting, as far as practicable, a similar soil for each crop, and a new soil would be preferred for the first season. In this case we can with more certainty determine how much of the malady, or of the exemption from it, is due respectively to the fertilizer, than if the soil, though apparently uniform, had been in parts previously tilled for different crops. On the succeeding year the same fields should be retained and divided in the same manner for the different branches of the experiment.

Under this head would also be included all tests of the different kinds of native and artificial soil,—determining the effects of an old soil repeatedly tilled, compared with a new or virgin soil; of a moist compared with a dry soil; and the different effects respectively of peat land, of salt marsh, of alluvium of various kinds; of grass land lately turned up, of woodland lately cleared; of calcareous, siliceous, and all other natural descriptions of soil.

IV. Other experiments might be made to discover the effects of different modes of mechanical tillage, independent of manuring. Observe the different effects of frequent hoeing, of moderate hoeing, and of the entire neglect of this operation. This may be considered a matter of considerable importance, because tillage is to be regarded as one of those luxurious appliances, which, in connection with high composting, may be supposed to have injured the health of the plant. It is, therefore, a rational subject of inquiry, to see whether an entire neglect of tillage, as well as of manuring, would serve in any degree to restore the original vitality of the plant, by allowing it, as it were, to run back into a state of nature. Many years' experiment, however, with the same seed, would be necessary

to show whether any such recuperative effects would follow from this neglect.

In accordance with these views, I would recommend to try the effect of planting the tubers without manure—using several good varieties—in wild pasture land, or in a recent clearing, in dry soil among the bushes, and leaving them, after they are planted, entirely to nature. Plant the same seed year after year, in this manner, taking annually a portion of the product for experiment in tillage land, and see whether the seed thus produced might not yield, on the average, more healthy and vigorous crops. The product of the tubers when planted in wild land, under these conditions of entire neglect, should be used exclusively for seed. The yield would probably be too scanty to be profitable for any other purpose. If such an expedient should be followed by the improved health of the plant, it would not be an impracticable project to resort exclusively to this method of procuring seed. This leads us to consider other

V. Experiments in relation to different methods of procuring seed. Beside the one suggested in the last paragraph, various methods have been recommended, by which the properties of seed potatoes might be improved, or an improved crop obtained by adopting certain principles of selection. It has been frequently advised to use for seed potatoes raised in a distant part of the country, or in a foreign country, and in a soil and climate differing essentially from our own. In order to carry out this experiment in full, we should try the different effects of seed obtained in the one case from the extreme southern limit of the potato culture, and in the other case from its extreme northern limit. How would two crops of Chenangoes differ under the same conditions of soil and culture, the seed for one crop being raised in Newfoundland, and for the other in Florida? It would be no idle use of one's time or labor to try a course of such experiments, and to observe the comparative thrift and soundness of the two crops in similar soil and situation, and under similar circumstances of culture.

Mr. Pretz recommends raising our crops from carefully prepared tubers. He maintains that "as this plant is unable to produce seeds, when in a degenerated state, we must resort to the tubers which have the faculty of propagation (of ripening their balls.) After selecting the best of these, expose them to

the air, sheltered from the rays of the sun, till they become thoroughly dry; then bring them into a room free from frost and completely cover them with dry ashes of peat or mineral coal. Plant the seed thus preserved, without being cut, in well prepared and deeply cultivated ground, properly drained. A field that has produced several crops since last manured will be best for this purpose, and no manure should now be applied." He thinks that by repeating this process annually, in a few years a perfect cure might be expected. Though we may entertain no such hopes, we may agree with the author of the suggestion that it is one of the numerous methods of improving the properties of the potatoes which are to be used for seed.

Might we not take a hint from the practice of florists, who in order to obtain fine flowers, expose the bulbs and roots to a drying process, which in some sorts deprives them of all moisture and apparent vitality? If it were possible to dry the tuber of the potato plant to such an extent as to deprive it of all moisture without injuring the vitality of the buds or sprouts—might we not reckon upon some alterative effects which would improve its productive properties? Although it does not seem to be the design of nature that the tuber in its wild state should undergo such a process of desiccation, it is not improbable that as a course of regimen for the cure of disease it might be attended with advantages.

Some years since it was advised to resort to seedlings obtained from the ball. This having been repeatedly done without apparent benefit, Mr. Bradford recommended to procure seedlings raised from the balls or the tubers of the wild potato plant. This recommendation is certainly worthy of trial, and may be attended with triumphant results. But should the seedlings thus procured produce a diseased crop the hypothesis that attributes the potato disease to the effects of old age must be considered incorrect. The remote cause of the disease must then be regarded as enveloped in mystery. But the subject would still be worthy of careful investigation of its exciting causes, by guarding from which we can alone expect to secure the health of our crops.

It has been observed that a crop is more likely to be affected with the malady if the blossoms fall without producing seed.

All the tubers of such plants should be rejected as seed potatoes, which should be carefully selected from the product of those vines which matured their bulbs. This may be another expedient for increasing the chances of a healthful crop, as well as for increasing its abundance.

VI. Another course of experiments should be made to ascertain the different degrees of liability to the disease that exists in the various sorts. The varieties of the potato are almost infinite in number. These, it is well known, differ exceedingly in quality, and the best varieties commonly yield the least abundant product. Some sorts are hardly worthy of cultivation, except for swine. It is not probable that all these are equally subject to the malady. Not only ought this point to be ascertained by experiment, but the different varieties should be classified, in order to determine whether the disease is milder or otherwise in those of a particular character; in those for instance, of a certain shape or color. We should learn whether the white-meated sorts are more liable to be affected than those with yellow, red or blue meats; and whether the color of the meat has any connection with a constitutional liability to the disease or exemption from it. I think I have noticed that the yellow-meated kinds are not so badly affected as those with white meats; but the former are not so good for the table as any of the other sorts. If, however, a superior degree of exemption from disease be connected with this yellow hue of the pulp, there is good reason for endeavoring to improve the quality of the yellow kinds, by raising seedlings from them.

It is not unlikely that there may be some constitutional predisposition to disease which is greater not only in some particular sorts, but perhaps in those of certain color of the pulp;—as in the human system there is a constitutional liability to pulmonary complaints in persons of a peculiar complexion. I would, therefore, experiment not only with individual varieties, but with *classes*,—carefully noting the liability of the white meats compared with the yellows, the reds and the blues, and learn whether any color, on the average, is more or less subject to disease than the others.

VII. The comparative advantages of late and early planting have not been overlooked, and they are worthy of still

further investigation. I was informed last summer by a neighbor that he had cultivated a certain early variety of the potato upwards of twenty years in succession for the market, and had not observed that they have been affected with the malady. Many experiments have been made which have resulted in favor of early planting. This fact might be explained by supposing that the plants of an early crop arrive at the flowering period when the weather and season are favorable to vigorous health and development, and at that stage of their growth when the disease is most likely to affect them. Hence we may explain why the early planted crops are more likely to produce balls and to ripen their seeds.

The following experiments might be made with the view of obtaining information under this head:—Plant one field with potatoes forced in a hot-house calculated for the earliest possible maturity. Plant another field as early as practicable with potatoes which have not been forced. Plant a third field with the same sort at a late period. It would be advisable to watch the effects of the forcing process upon the health of the product. Such a process might serve to aggravate the tendency to disease. A considerable amount of information in regard to the effects of early planting might be gathered from the experience of market gardeners.

VIII. Some advantages may be found to result from planting the potato in succession after certain specified crops. Some kinds of plants may affect the soil favorably, and others unfavorably with respect to the healthful growth of the potato. We know that this principle of rotation must be observed in planting the most of our crops, if we would secure both a healthy and abundant product, and the knowledge and observance of certain rules of rotation constitutes an important part of the science and practice of agriculture. We may, therefore, not unreasonably expect to reap some valuable information from experiments of this class, relating to the potato culture. It is highly probable that the soil, immediately after a certain crop, may be favorable to a healthy product, and that these effects may be sufficient to make it expedient to raise the potato invariably in succession with some other vegetable,—it may be some one of the cereals, it may be clover or pease, or it may be after a fallow.

It would be wise, therefore, to institute a course of experiments under this head; planting potatoes after each of the most important articles of cultivation, and repeating them until we have obtained satisfactory evidence of their effects. It is important also to learn the effects, in detail, of planting potatoes year after year in the same field.

IX. Meteorological influences are mostly beyond our control. But, though an extensive crop could not be sheltered—if by sheltering a small part of a crop from cold rains, heavy dews and late summer frosts, we found that the soundness of the tuber was preserved,—this sort of shelter might be used in future just to the extent required to secure a few potatoes for seed. Experiments under this head should be instituted for their theoretical, rather than their practical value. If the malady have a meteorological origin, it would be important to ascertain the fact, even though the remedy should be beyond our reach. Such a discovery would at least put an end to fruitless investigations to find out other causes.

There is one branch of experiments under this head that might be practically useful. I allude to such as have reference to the advantages that might accrue from that sort of protection which is afforded by a wood, surrounding the field on all sides, or merely bounding it on one, two or three sides. The different effects proceeding from the shelter of evergreen and of deciduous woods should also be compared. If the disease have a meteorological cause, it is possible that a dense and lofty wood might possess the power of averting this influence, in some degree, from a small tract, surrounded by it, or in close proximity to it.

Lastly, it would be expedient to devote some time to experimenting upon the value of different nostrums, proposed, and likely hereafter to be proposed by their respective authors. The most of these, however, would probably come under one or the other of the preceding heads.

Here then is a series of nine different classes of experiments, each including a large number of individual experiments. A great many that are new and valuable would probably be suggested by the experience of one who should be employed in reducing them to trial. Such an undertaking could not fail to develop information sufficiently new, both in its details and in

the classification of these details, and sufficient also in amount to warrant the expenditure of public money for this purpose. These experiments, while gradually unfolding a variety of measures by which we might lessen the ravages of the potato disease, would serve also to bring to light many valuable facts concerning the general culture of this plant.

This is no whimsical project of general experimental farming, in which nobody knows precisely what ought to be done, or what will be done. It is a definite scheme, confined exclusively to a single crop, and having reference solely to the attainment of a certain kind of information. The expenses of conducting such a course of experiments could not be very great, because they would be nearly balanced every year by the value of the crop. A farm consisting of five or six acres of varied soil and surface would be sufficient. A few hundred dollars per annum would defray the expenses of superintendence, and the crops would pay the cost of labor, both of men and animals.

HORSE AND OX SHOEING.

BY DAVID STILES, JR.

The subject of horse and ox shoeing is intimately connected with agriculture. Farm operations cannot be carried on among us without shoeing. Yet this department is almost entirely neglected; no definite knowledge on the subject is laid before the public in a way adapted to produce improvement. From what I have read of the advance of shoeing horses in England, I am compelled to believe that the art was better understood there as a general thing, a century ago than it is at present in this country. The English, for many centuries, have been lovers of good horses. Their parks and hunting grounds, their race courses and stage routes, their hackney coaches and livery stables, have brought out many of the best horses; and as a people they have done more than any other to diffuse a thorough knowledge of this useful animal.

Shoeing is a necessary evil. No hoofs are made better by shoeing. Nature never designed that animals should be shod. In many parts of the world where horses are much used, the

art is not known. On our western prairies, there is but little or no need of shoeing. But among us, where the soil is gravelly and hard, shoeing must be practised, and it may be done without injury to the feet. When, however, it is improperly executed, it is productive of more evil than is generally supposed. Among these evils are contraction, inflammation, founders, sprains, ring-bone, stumbling or tripping, over-reaching, and sprung-knees; any one of which renders the horse less valuable and sometimes dangerous to the rider. I do not mean to affirm that these evils are *always* brought about by bad shoeing, but that they are oftener than is supposed. The smith pretends that he has done all that can be done to give relief to the animal or to remedy the evil. The owner does not pretend to know any thing about the matter. But experience soon teaches that some further method must be adopted to help the trouble. But what to do next is the question in the mind of the smith. He blunders perhaps on another plan, and with like success. All the while the horse is growing worse and losing his flesh, and the owner his work, when if the smith had known at first the proper treatment and how to apply it, both animal and owner might have been saved much pain and expense.

No class of mechanics need a more careful education for their calling than smiths or farriers; but, as a general thing, it is the most neglected. The son of the wealthy farmer is sent to school and soon looks higher than a smutty blacksmith's shop. But the poor boy is driven there to gain a livelihood, and if he wishes to learn the trade and become some day his own master, he is obliged to learn it of one who knows but little himself on the subject. We sometimes hear people complain of the English laws in regard to apprenticeship—six or seven years to learn to shoe a horse is too long, say they. Now for my part, I would willingly have a son of mine serve that time to learn this important and difficult trade. But when we take into consideration that many of our smiths shoe horses and oxen, iron wagons and other carriages, and in addition make horse nails, which in England is a trade of itself, we have an array of trades combined, that it would take the best part of a lifetime to learn. The wonder is, that we are able to do so many different kinds of work,

and yet do them so well; proving that should there be a division of labor here, as there is in the old country, we should, perhaps, be able in a short time to outstrip their very best workmen.

But to become good horse shoers, we must learn the anatomy of the foot of the horse. Few smiths understand its structure or the laws that govern its health, and the violation of which sooner or later produces sad consequences. I will here mention a very common error among our smiths, and that is, the neglecting to dress down the sole of the foot at shoeing. The wall or rim, which is about three-eighths of an inch in thickness, and extends all around the outside of the hoof, is pared down without stint, while the bottom or sole is left untouched, or if pared at all, it is done in a bungling manner. The foot of the horse in a wild or unshod state, is constantly dressed or scoured on the bottom. Though the rim receives most of the weight, (as may be noticed in the print of the colt's track before being shod,) yet the sole and frog are subjected to a continual wear, and for this wear nature makes provision. Now when the animal is shod, this dressing of the sole in the natural way ceases; and not only so, but foul substances collect and are retained there by the shoe, producing a rotten appearance under and around the web of the shoe. And when the shoe is suffered to remain on for a long time,—especially in warm weather,—maggots have sometimes been bred, which have penetrated the tender portions of the frog, and nearly destroyed its health and vigor. In such cases, remove the shoe, and turn the horse out to pasture, and these excrescences will disappear.

Just so long as the horse is shod, must a judicious paring of the sole and the corners of the frog, near where the shoe comes in contact with it, be kept up. This can best be done by an English shave, the end of which is shaped like an iron used at saw mills to mark the measure of boards. With this, only a few moments is needed to give a thorough scraping, but if the shovel-shaped buttress is used, unless great care is exercised, it will not only penetrate through the sole in some places, but leave others entirely neglected. If the shoe be properly made, not too thick at the heel, the frog will need

no trimming, except as before mentioned. Many persons imagine that the frog must not come in contact with the ground; but this is a mistake. That Being who made the horse, placed the frog as low in his foot as any part of the hoof. It thus acts as an elastic wedge to give life and health to the foot. And whenever it is in effect removed from its natural position by thick, high heel shoes, it shrinks away, becomes thrushy, loses its functions, and contraction of the whole foot follows. I well know that those horses that put their fore feet out forward in standing—caused by hard driving or excessive graining—will, for a few months, go better in thick heel shoes. This elevating of the heel relaxes the cords that pass down the back part of the leg, and over the shuttle bone to the coffin bone. And if the health of the frog could be preserved in this elevated position, all would be well. But it cannot be, and when its elasticity is lost, other parts of the foot and leg suffer with it. The evil may be remedied by turning up a portion of the shoe like a calk. Where the ground is soft, it will settle into it, and give moisture and action to the frog and sole of the foot.

Shoes for Contracted Hoofs.—In cases like the above, the hoof presents a long, narrow appearance, and is hollow on the bottom. This is called contraction. Upon such hoofs should be placed a convex shoe, dipping outwards from heel to toe at an angle—if a bad case—of forty-five degrees, and less, as the case may require. This is the reverse of a dishing of the shoe, which is practiced by most smiths for all horses alike, while it is only the flat footed horse that requires it. Convex shoes may seem to some altogether useless, but I have tried them too long and with too much success to abandon them now. For several years I supposed that they were original with me—as I had never seen any thing of the kind—but I have since read about them in old, standard works on horse shoeing, written in England before I was born, and of course must give up all claims to their invention.

Shoes for Flat Feet.—Shoes must be dished for horses with flat feet, for if the sole of the foot be subjected to constant pressure, a bruise is the consequence. In such cases it often occurs that the concave process is not carried far enough;

the smith, perhaps, not taking into consideration that the weight of the horse causes the sole to descend. There should be at least the thickness of a cent between the shoe and the sole.

Shoes for all Horses should be of good length and well fitted around the quarters. Here is the thinnest portion of the whole wall, and if the shoe does not come full out to to the outside wall, it presses in upon the sole, producing, perhaps, either rupture of the wall called quarter-cracks, or corns and bruises on the sole. More of the weight of the horse comes on the quarters than on any part of the hoof. Special care should be taken that no portion of the quarter be removed by the rasp. A shoe may and should, in many cases, be set back, and the toe of the hoof cut off with the point of a scythe, especially when the hoof is flat—and be rasped off smooth. But to rasp the hoof all over, as is often done to make it look well, is very injurious. Apply the rasp no higher up than the clinches of the nails. There is a peculiar enamel covering the surface of the hoof, provided by nature for its protection. The removal of this enamel disposes the wall to dry up and crack, and sometimes even produces inflammation.

Shoes for tripping and stumbling may be turned up slightly at the toe like a sled-shoe, and the hoof pared to receive the part thus turned up. Shoes for stumblers should not be heavy, especially at the toe.

Hoop Shoes.—These are seldom needed except where it is necessary to relieve the heel, as in case of corns or quarter-cracks. They cover too much of the foot, and retain noxious matter, and are more unnatural than any other shoe.

Clips.—These are substantially reversed calks. I have often seen the wall of the hoof opened up quite a distance to receive them. Sometimes the hoof is so weakened by this means as to produce rupture. There may be cases where they are useful.

Tips.—These cover only that part of the hoof towards the toe, and are designed to protect the edges of the hoof, while the animal is at pasture. But they should be considered only as impediments. The benefit to be derived from the entire hoof coming to the ground is far greater than any saving

of the edges by these tips. If the horse is to remain out but two or three weeks, the ordinary shoes may remain on his feet, provided a little care is used in cleansing the bottom of the hoof—for which the English shave before described is an excellent tool.

Shoes to prevent interfering should be light and of narrow web, especially upon the inside, with three nail holes near the toe. They should be straight at the point where they come in contact with the ankle of the opposite leg. The hoof should be pared lowest on the outside to turn the ankle, that the other hoof may pass by clear. Yet if the inside sole is not dressed, the wall or rim soon breaks, and the inside is found to be actually lower than the outside. The hoofs of interfering horses are invariably poorest on the inside, and it was by observing this fact, that my attention was first called to the importance of a judicious paring of the sole in all cases.

Shoes to prevent over-reaching should be long and for the forward feet heavy, especially at the heels, and for the hind feet light, with heavy toes. The hoofs should be well pared at the toe.

Shoes for the turf should be very light, with a web not more than half the ordinary width. Great care must be used that the wall be not cut too closely in paring. No amount of iron or any other substance can take the place of the elastic hoof. I have no doubt that many a heat on a race-course has been lost from this cause alone.

Calked Shoes.—These are for winter use. The web should be narrower than for summer, and so hammered on the inside edge as not to retain the snow in balls. The calks should be short and neat, and standing out slightly at the edge to let out the ball.

Spring-heel Shoes.—For this kind of horse-shoe one or two patents have been issued. One of the shoes is of iron or steel, the other of rubber. No one can fail to see that these contrivances must increase the expense of shoeing; but should they not, their complicated structure render them more liable to get out of order, and to damage the hoof, besides forming receptacles for the filth and mire into which the horse may chance to step. Let us have a sufficient quantity of the elastic hoof of nature's own providing, and then all will be "very good."

Various kinds of horse-shoes have been introduced and new modes of attaching them to the feet have been advocated. The latest novelty in the way of shoes is one with a rim or calk extending around the whole shoe from heel to heel, to be used both for summer and winter. If there were no other objection to this invention it is this: that they must always be of iron, and cannot be sharpened for winter use. Another plan is that of slanting off the heel of the shoe, and the reason given is that the horse may strike the ground more towards the centre of the foot. But what advantage is gained by this is more than I can imagine. Horses that throw their feet far ahead in travelling very fast may thus strike their feet, but generally they do not, while with such shoes they must roll back the hoof, producing severe strain upon the shuttle or navicular bone and cords of the leg. Neither can they be calked for winter or used for draft.

Other methods for fastening horse-shoes have been adopted, among which are screws having a welt around the edge of the hoof just above the edge of the shoe, and fastening the welt and shoe together by the screws. The welt being smaller than the lower edge of the hoof retains the shoe upon the foot.

I will now briefly notice some of those diseases of the feet which are more intimately connected with the shoeing of horses. And first—

Contraction.—The hoof of the unshod colt approaches nearly to a circle. But after being shod a few years the hoof grows long and narrow, and hollow on the bottom. The frog diminishes in size and becomes hard and dry. In such cases use the convex shoe with low heels, that the frog may come near the ground. This shoe will spread the hoof in a natural way and remove the pressure from the frog and coffin bone, and if the case has not become chronic a cure is soon effected.

Founder.—The fleshy plates between the coffin bone and the wall of the hoof are liable to inflammation, as they are full of little blood vessels. In a severely contested race these blood vessels become distended or stretched to their utmost tension. And when the weight of the horse is thrown upon them with great violence they are often ruptured and extreme soreness succeeds. Or if the horse is only heated and then suffered suddenly to cool, either by going into the water or standing where the cold

air blows upon him, more or less inflammation and sometimes acute fever are brought on, that prove fatal to the health of the hoof. These symptoms are clearly marked, and yet are often taken for those of the cholic. If the trouble is in the feet, there will be a frequent shifting of the fore legs, but no pawing, much less a motion to reach the belly with the head or hind feet. The animal shows an aversion to placing the feet in an upright posture under the body, looks round for a place to lie down, but seems afraid to draw his feet under him for the purpose, and when down lies still. The feet when sounded with a hammer will throb, and on examination will be found hot and feverish. In such cases obtain the services of a good veterinary physician as soon as possible.

Pumaced Feet.—These are so much like what I call weak feet, that, though different causes may produce them, I shall place them together. By inflammation or other causes, the elasticity between the coffin bone and the wall of the hoof is lost, the bone descends, and a hollow appearance is produced on the outside, between the coronet and the toe, while the bottom of the foot inclines to grow flat. Between the sole and wall is a crease nearly a quarter of an inch wide, indicating that the union between the wall and other parts of the foot was not perfect. Horses thus affected may do considerable work, but are unfit for roadsters. Little can be done for them, except to give them a wide web shoe of good thickness. Let purchasers beware of such horses. Look out for those hoofs that are hollowed on the outside between the hair and the toe.

Quarter Cracks are ruptures on the wall near the heel, penetrating nearly through in all cases, and sometimes causing a complete separation to the quick or fleshy plates. With such hoofs a bar or hoop shoe is required, that the weight of the horse may be thrown upon the other side of them. Then take a plate of iron an inch wide and two inches long, drill a number of holes on each side, and with some small wood screws about a third of an inch long make it fast on each side of the crack. These plates may remain on till the hoof heals, yet hoofs with these rents cannot be depended on, though they may appear perfectly sound.

Corns appear in the angle of the hoof near the heel. They are of a reddish or blood-shot appearance—soft and spongy.

They are generally caused by the shoe being worn too long. The shell or wall of the hoof grows over the shoe, thus throwing the weight in upon the sole. This produces a bruise. The horny substance of which the sole is composed is secreted in less quantity, the blood from the vessels which have been ruptured mingles with the imperfectly secreted horny matter, and as this process is going on it soon makes its appearance on the outside. Corns should never be taken out deep, as thereby the hoof is much weakened. Corns, though they do not often produce lameness, are seldom if ever cured. Horses with corns must be oftener and more carefully shod than those free from them.

Thrush is a discharge of offensive matter from the cleft of the frog. When the frog loses its functions, either from foul matter being collected and retained by the shoe, or from being raised too far from the ground, or from contraction of the hoof, pus is secreted with the horny substance, or instead of it. For a cure, salt is sometimes used, or any astringent medicine. But, first of all, remove the cause that produced the disease; otherwise it will become chronic, and perpetual lameness ensue.

Wounds in the sole or crust, by nails or stones, produce inflammation. In other words, when any substance is deposited in the quick or fleshy plates, matter is speedily formed which causes extreme pain. This matter being pent up will in a short time work its way around for some distance, and frequently discharges itself at the top of the hoof before its location can be discovered. In such cases take off the shoe, scrape the bottom of the hoof all over, to find, if possible, the exact seat of the trouble; notice all the dark spots, and dig them out a little with the point of a knife, and apply the pincers around the edge of the hoof to detect the most tender place. When the matter is found, it can be worked out at a small hole, either with a crooked horse-nail or a pen-knife; then fill up the aperture with a little tarred rope or other soft substance. Do not put in rosin, especially when the wound is on the sole, as that, being a hard substance, often proves as uncomfortable as a small stone. If a cure is not thus effected, probe the wound out again till fresh blood is found; but if this was done in the first place, there will be little need of a second operation.

Ring-Bones are sometimes caused by the unnatural turning or twisting of the foot, caused by the paring of the hoof, or the make of the shoe, or both. Sometimes a rolling stone or other obstruction, as a snow-ball in the shoe, produces a sprain in the pastern joint, around which is formed a spongy substance, which soon becomes hard like the bone, forming a ring nearly around the joint. This is usually only on one side—generally the inside. The foot is turned inwards, thereby causing the horse to tread upon the outside of the hoof, which soon wears down the shoe, and presses it towards the inside. In this case the shoe should be much thicker on the outside, and should be set full, and the hoof should be pared down on the inside. When ring bones come on the forward feet, much may be done by shoeing to favor the travel of the horse.

Ox-Shoeing.—This subject demands more attention than is generally given to it. Sometimes the sale of a yoke of oxen is lost by bad shoeing, and I have known cattle to sweat in cold weather by crippling on short shoes. It costs much more to keep a pair of cattle in flesh that are poorly shod, besides much loss of time on the road and use of the whip.

No man is fit to shoe an ox who has not served a proper time with a good workman. Even then he will have much to learn —it is practice that makes perfect. The form of the shoe must correspond with the rim or wall of the hoof. Many smiths crook their shoes too much at the heel. When this is the case, they turn the claws inwards, press them together, and cause them to swell, producing inflammation between the claws, and more or less fever in the whole foot. Shoes that are not punched properly, cannot be set properly. If, for instance, a shoe is punched *under* at the heel, it must be crowded out over the edge of the hoof to prevent pricking the ox; but if it is punched *standing out*, the nails will run up naturally, and the shoe be retained in place. The hoof of the ox varies, as you nail round from heel to toe, from standing out a little at the heel, to straight in the centre and falling under at the toe. And to correspond to this inequality, all shoes for oxen should be punched. These can be set on in half the time, and much better, too, than shoes that are improperly fitted.

The calks should be short and neat, and well steeled and hardened, especially at the toe. Ox shoes should be made of Sweed's iron—as should also horse shoes—and contain not less than six nail holes for the fore feet, and five for the hind feet—most of the holes toward the toe, as there the hoof is thickest and strongest. In nailing, use a little gouge to cut out under the clinches on the inside claws of the forward feet, to prevent interfering. The importance of putting on ox shoes of good length, is not so generally appreciated as it should be. If an ox once gets in the habit of treading or rolling back on his heels by wearing short shoes, it will require very long ones to prevent it. As a general rule, the hoofs of oxen should be so pared that a straight edge will fit across the claws, so that the foot may set perfectly flat on the ground.

The foot of the ox is less complicated than that of the horse, and far less liable to disease. By bad shoeing, or other causes, the claws are sometimes sprained, producing callous joints resembling ring-bones on horses. Inflammation in the forward feet of oxen from drawing heavy loads on long journeys with short or unsuitable shoes, has sometimes produced a partial separation between the wall or shell of the hoof and the bones of the foot, resembling founders in the horse.

The proper treatment of oxen in the slings cannot be too strongly insisted upon. Few cattle will strive hard in the slings, if they are taken up properly. They stand better to bear about half their own weight, resting the other half, of course, on the slings. If taken up much higher than this, they will be uncomfortable, and strive to gain their liberty. If the slings are lower they will not be sufficiently confined to submit to the fastening of their legs. I use no ropes or straps for this purpose, as they are liable to stretch and to loosen the feet. If then the ox strives, there is danger of his straining the cords and joints—if not to break a leg, as I have known to happen. A twisted chain, covered with leather, and made fast round the foot with a small lever, is the best fixture I have ever seen for this purpose.

The slings should be in perfect order in every part. No ox should be confined in them over forty-five minutes. The longer they are in the slings the more they will struggle to free themselves. I have known cattle to leave the slings with bruises

and galls, which injured them more than the cost of shoeing, and only because of improper management. The shoeing of oxen, as of horses, is unnatural, either with iron or any other metal. Iron, for the health of the feet, may be the worst of all metals, so that Nero's folly in shoeing some of his favorite horses with gold, was not, perhaps, so great after all. But taking all things into consideration, iron is the best article for horse and ox shoes, and no other metal will in all probability ever take its place.

After an ox has been shod two or three years—as every observing man knows who has had much to do with oxen—the feet become tender and rotten where the nails have been driven, and sometimes so thin on the bottom that he is unable to go at all without shoes. This thinness is occasioned partly by rust or canker, which is indicated by dark spots, especially around the nail holes, and partly by a want of proper cleansing and scraping of the hoof at shoeing.

All oxen that require constant shoeing should, if possible, be turned out to grass at least one month in a year without shoes, that new and healthy horn may be formed, which will add strength and beauty to the hoof. Though the outside may not at once show the improvement, yet before the return of another year it will be clearly observed in the firmness and capacity to hold shoes. The feet of many oxen are so thin and tender that their owners hesitate taking off their shoes and turning them to pasture, fearing they will not be able to get round to feed. But this soreness will soon disappear, as the new hoof forms and hardens over the bottom of the feet.

The ox is the most patient and docile, as well as one of the most useful of all the animals that the All-wise Creator has given for the service of man. Though he has not the sprightliness and intelligence of the horse, yet he bows his neck in humble and willing submission, and endures hardship far beyond our consideration, without a sign of complaint. He should therefore be properly shod, well fed, well sheltered, and kindly treated, not only as a return for all the toil he performs, but that his health and strength may be prolonged for still further service.

APPENDIX.

General Statutes relating to Agriculture.—The following are believed to comprise all the newly revised laws that especially and directly affect the interests of agriculture, or the farmer's rights of property. These statutes take effect from and after May 31, 1860.

CHAPTER 16.

OF THE STATE BOARD OF AGRICULTURE.

Section 1. The governor, lieutenant-governor, and secretary of the Commonwealth, one person appointed from and by each agricultural society which receives an annual bounty from the state, and three other persons appointed by the governor with the advice and consent of the council, shall constitute the state board of agriculture.

Sect. 2. One-third of the appointed members of the board shall retire from office on the first Wednesday of February in each year, according to their appointments. The vacancies thus occurring shall be filled by the governor and council, or the agricultural societies, as the offices were before filled, and the persons thus appointed shall hold their offices for three years from the expiration of the former terms. Other vacancies may be filled in the same manner for the remainder of the vacant terms. The present members of the board shall continue to hold their offices during the terms for which they are appointed.

Sect. 3. The board shall meet at the state house at least once in each year, and as much oftener as may be deemed expedient. No member thereof shall receive compensation from the state, except for personal expenses when engaged in the duties of the board.

Sect. 4. They may appoint and prescribe the duties of a secretary of the board, who shall receive a salary of two thousand dollars a year; and who at such times as the board approve may employ a clerk at a salary not exceeding six hundred dollars a year.

Sect. 5. They shall investigate such subjects relating to improvement in agriculture in this state as they think proper, and may take, hold in trust, and exercise control over, donations or bequests made to them, for promoting agricultural education, or the general interests of husbandry.

Sect. 6. They may prescribe forms for and regulate the returns required of the different agricultural societies, and furnish to the secretary of each, such blanks as they deem necessary to secure uniform and reliable statistics.

Sect. 7. They shall annually on or before the fourth Wednesday of January, by their chairman or secretary, submit to the legislature a detailed report of their doings, with such recommendations and suggestions as the interests of agriculture may require.

Sect. 8. The secretary of the board shall in each year cause to be made and published for distribution, as full an abstract of the returns of the agricultural societies as he deems useful.

Sect. 9. He may appoint one or more suitable agents, to visit the towns in this state, under the direction of the board, for the purpose of inquiring into the methods and wants of practical husbandry, ascertaining the adaptation of agricultural products to soil, climate, and markets, encouraging the establishment of farmers' clubs, agricultural libraries, and reading-rooms, and of disseminating useful information in agriculture by means of lectures or otherwise. Such agents shall annually in October make detailed reports to the secretary of the board.

CHAPTER 66.

OF AGRICULTURAL AND HORTICULTURAL SOCIETIES.

Section 1. Every incorporated agricultural society which has raised by contribution of individuals and put out at interest on public or private security, or invested in real estate, buildings, and appurtenances, for its use and accommodation, the sum of one thousand dollars, as a capital appropriated for the uses of the society, shall be entitled to receive in the month of October annually, out of the treasury of the Commonwealth, the sum of two hundred dollars, and in that proportion annually for any greater sum so contributed and put at interest or invested; but no society shall receive from the treasury more than six hundred dollars in one year.

Sect 2. Every society which claims said bounty shall annually on or before the tenth day of December, file in the office of the secretary of the board of agriculture a certificate signed by its president and treasurer, specifying under oath the sum so actually contributed and put at interest or invested in real estate, buildings, or appurtenances, for its use and accommodation, and then held so invested, or well secured as a capital stock.

Sect. 3. The amount of bounty to which a society is entitled for any year shall be ascertained by the certificate last filed by it under the preceding section.

Sect. 4. No society receiving the bounty shall distribute any part thereof for an animal or article for which a premium is awarded, unless it was produced within the limits of the society, or the animal has been owned and kept within its limits, by the person to whom the premium is awarded, for three months next preceding the award. And no animal or article for which a premium has been awarded to the owners by any such society shall be considered a subject for any further premium of the society, except for qualities different from those for which the former premium was awarded, or for a higher premium, and no animal or article shall be offered for a premium at more than one such society in the same

year; but nothing in this chapter shall affect, restrain, or limit, a competitor for premiums offered by the state board of agriculture or the Massachusetts Society for the Promotion of Agriculture to be awarded within the incorporated county agricultural societies, but such premiums shall be subject to the rules and regulations prescribed by said board or the trustees of said Massachusetts Society.

SECT. 5. Every such society shall annually on or before the tenth day of December, make a full return of its doings, signed by its president and secretary, to the secretary of the board of agriculture, embracing a statement of the expenditure of all money, specifying the nature of the encouragement proposed by the society, the objects for which its premiums have been offered, and the persons to whom they have been awarded, and including all reports of committees and all statements of experiments and cultivation regarded by the president and secretary as worthy of publication; and shall accompany the same with such general observations concerning the state of agriculture and manufactures in the state as it may deem important or useful. The return, whether in printed or manuscript form, shall be marked in such manner that those passages in the several reports and statements deemed by such officers most worthy of public notice, study, and application, may be easily distinguished.

SECT. 6. A society which neglects in any year to comply with the laws relating thereto, or with the regulations of the board of agriculture, shall not be entitled to the bounty of the state the year next succeeding.

SECT. 7. Every society which receives said bounty shall offer annually, by way of premiums, or shall otherwise apply for the encouragement or improvement of agriculture or manufactures, a sum not less than the amount so annually received, and shall offer such premiums for agricultural experiments and in such manner as the state board of agriculture requires.

SECT. 8. Every such society shall annually offer such premiums and encouragement for the raising and preserving of oaks and other forest trees, as to it seems proper and best adapted to perpetuate within the state an adequate supply of ship timber.

SECT. 9. All money offered for premiums which is not awarded or paid shall be put out at interest and added to the capital stock of the society.

SECT. 10. The foregoing provisions shall not extend to an agricultural society incorporated for any territory less than a county, except by special enactment for that purpose.

SECT. 11. Incorporated agricultural societies may by their officers define and fix bounds of sufficient extent for the erectio nof their cattle pens and yards, and for convenient passage-ways to and about the same, on the days of their cattle shows and exhibitions, and also for their ploughing matches and trials of working oxen; within which bounds no person shall be permitted to enter or pass unless in conformity with the regulations of the officers of such societies.

SECT. 12. Whoever contrary to the regulations, and after notice thereof, enters or passes within the bounds so fixed, shall forfeit a sum not exceeding five dollars.

SECT. 13. The foregoing provisions shall not authorize a society to occupy or include within such bounds the land of any person without his consent, nor to obstruct the public travel on any turnpike or public highway.

SECT. 14. The officers of each society may appoint a sufficient number of suitable persons, inhabitants of the county, to act as marshals at cattle shows and exhibitions, who shall have and exercise all the powers of constables in relation to the preservation of the public peace and the service and execution of criminal process within the respective towns where such shows and exhibitions are held, and which process may be directed to them accordingly; and they shall exercise their office from twelve o'clock at noon of the day preceding the commencement of such shows and exhibitions until twelve o'clock at noon of the day succeeding the termination thereof, and no longer.

SECT. 15. No incorporated agricultural society shall award a premium for a field crop, without satisfactory evidence under oath presented to its committee or other officers, that the whole merchantable crop entered for premium was weighed when harvested if a grass or root crop, and when threshed or husked if a grain or corn crop; but such society may require further modes of ascertaining the merchantable amount of product, either at the time of harvesting or at any other times.

SECT. 16. The agricultural societies shall commence their annual exhibitions as follows:—

Middlesex North, and Highland, on the last Thursday but two in September;

Middlesex South, and Hampden East, on the last Tuesday but one of September;

Middlesex, and Hampden, on the last Thursday but one of September;

Essex, Worcester North, and Berkshire,* on the last Tuesday of September;

Housatonic, on the last Wednesday of September;

Franklin, Worcester County West, and Norfolk, on the last Thursday of September;

Berkshire,* Worcester, and Bristol, on the first Tuesday of October;

Hampshire, Hampden, and Franklin, Worcester South, and Plymouth, on the first Thursday of October;

Barnstable, on the second Tuesday of October;

Nantucket and Hampshire, on the second Thursday of October;

Martha's Vineyard, on the third Tuesday of October.

Agricultural, Horticultural, and Ornamental Tree Associations.

SECT. 17. Ten or more persons in any county, city, or town, within the state, who by agreement in writing associate for the purpose of encouraging agriculture, horticulture, or for improving and ornamenting the streets and public squares of any city or town by planting and cultivating ornamental trees therein, may become a corporation by such name as they assume therefor, upon calling their first meeting and being organized in the manner provided in sections ten and eleven of chapter thirty-three; and shall thereupon during the pleasure of the legislature

* The present legislature (1860) will doubtless rectify this accidental error in the passage of the Act of 1859, and relieve the Berkshire Society from holding a fair on the last Tuesday of September.

have for their purposes all the rights, powers and privileges given by sections ten to thirteen of said chapter inclusive, and may hold real and personal estate not exceeding ten thousand dollars.

Farmers' Clubs.

SECT. 18. Farmer's clubs properly organized and holding regular meetings shall, upon application made annually in November to the secretary of the state board of agriculture, receive copies of the report of said board and its other publications in proportion to the number of their members and applications so made. Clubs receiving such benefits shall annually in October make returns to said secretary of the agricultural experiments made by them, and of the reports of their committees.

CHAPTER 25.

OF FENCES AND FENCE VIEWERS, POUNDS, AND FIELD DRIVERS.

Fences.

SECTION 1. Fences four feet high and in good repair, consisting of rails, timber, boards, or stone, and brooks, rivers, ponds, creeks, ditches, and hedges, or other things which the fence viewers within whose jurisdiction the same shall lie shall consider equivalent thereto, shall be deemed legal and sufficient fences.

SECT. 2. The respective occupants of lands enclosed with fences, shall so long as both parties improve the same keep up and maintain partition fences between their own and the next adjoining enclosures, in equal shares.

SECT. 3. If a party refuses or neglects to repair or rebuild a partition fence which he ought to maintain, the aggrieved party may complain to two or more fence viewers of the place, who after due notice to each party shall survey the same, and if they determine that the fence is insufficient, they shall signify the same in writing to the delinquent occupant, and direct him to repair or rebuild the same within such time as they judge reasonable, not exceeding fifteen days; and if the fence shall not be repaired or rebuilt accordingly, the complainant may make or repair the same.

SECT. 4. When a deficient fence built up or repaired by a complainant as provided in the preceding section is after due notice to each party adjudged sufficient by two or more of the fence viewers, and the value thereof with their fees ascertained by a certificate under their hands, the complainant may demand, either of the occupant or owner of the land where the fence was deficient, double the sum so ascertained; and in case of neglect or refusal to pay the same so due, for one month after demand, he may recover the same with interest at one per cent. a month, in an action of contract.

SECT. 5. When a controversy arises about the rights of the respective occupants in partition fences and their obligation to maintain the same, either party may apply to two or more fence viewers of the places

where the lands lie, who after due notice to each party may in writing assign to each his share thereof, and direct the time within which each party shall erect or repair his share, in the manner before provided; which assignment, being recorded in the city or town clerk's office, shall be binding upon the parties and upon the succeeding occupants of the lands; who shall thereafter maintain their respective parts of said fence.

SECT. 6. If a party refuses or neglects to erect and maintain the part of a fence assigned to him by the fence viewers, the same may in the manner before provided be erected and maintained by any aggrieved party; and he shall be entitled to double the value thereof ascertained and recovered in the manner aforesaid.

SECT. 7. When in a controversy between adjoining occupants as to their respective rights in a partition fence, it appears to the fence viewers that either of the occupants had before any complaint made to them voluntarily erected the whole fence, or more than his just share of the same, or otherwise become proprietor thereof, the other occupant shall pay the value of so much thereof as may be assigned to him to repair or maintain, to be ascertained and recovered as provided in this chapter.

SECT. 8. Partition fences shall be kept in good repair throughout the year, unless the occupants of the lands on both sides shall otherwise agree.

SECT. 9. When lands of different persons which are required to be fenced, are bounded upon or divided from each other, by a river, brook, pond, or creek, if the occupant of the land on one side refuses or neglects to join with the occupant of the land on the other side in making a partition fence on the one side or the other, or shall disagree respecting the same, then two or more fence viewers of the place or places wherein such lands lie, on application made to them, shall forthwith view such river, brook, pond, or creek; and if they determine the same not to answer the purpose of a sufficient fence, and that it is impracticable to fence on the true boundary line without unreasonable expense, they shall, after giving notice to the parties to be present, determine how, or on which side thereof, the fence shall be set up and maintained, or whether partly on the one side and partly on the other side, as to them shall appear just, and shall reduce their determination to writing; and if either of the parties refuses or neglects to make and maintain his part of the fence according to the determination of the fence viewers, the same may be made and maintained as before provided, and the delinquent party shall be subject to the same costs and charges to be recovered in like manner.

SECT. 10. When lands belonging to two persons in severalty have been occupied in common without a partition fence between them, and one of the occupants desires to occupy his part in severalty, and the other occupant refuses or neglects on demand to divide the line where the fence ought to be built, or to build a sufficient fence on his part of the line when divided, the party desiring it may have the same divided and assigned by two or more fence viewers of the same place in the manner provided in this chapter; and the fence viewers may in writing assign a reasonable time, having regard to the season of the year, for making the fence; and if the occupant complained of does not make his part of the fence within the time so assigned, the other party may, after

having made up his part of the fence, make up the part of the other, and recover therefor double the expense thereof, together with the fees of the fence viewers, in the manner provided in this chapter.

SECT. 11. Where a division of fence between the owners of improved lands has been made either by fence viewers or under an agreement in writing between the parties, recorded in the office of the clerk of the city or town, the several owners of such lands and their heirs and assigns shall erect and support said fences agreeably to such division; but if a person lays his lands common and determines not to improve any part of the same adjoining the fence divided as aforesaid, and gives six months' notice of his determination to all the adjoining occupants of lands, he shall not be required to keep up or support said fence during the time that his lands lie common and unimproved.

SECT. 12. When one party ceases to improve his land or lays open his enclosure, he shall not take away any part of the partition fence belonging to him and adjoining to the next enclosure, *provided* the owner or occupant thereof will allow and pay therefor so much as two or more fence viewers in writing determine to be the reasonable value thereof.

SECT. 13. When land which has lain unenclosed is afterwards enclosed or used for depasturing, the occupant or owner thereof shall pay for one-half of each partition fence standing upon the line between the same land and the land of the enclosures of any other occupant or owner, the value thereof to be ascertained in writing (in case they do not agree between themselves), by two or more of the fence viewers of the same place wherein such partition fence stands; and if such occupant or owner, after the value has been so ascertained, neglects or refuses, for thirty days after demand made, to pay for one-half of the partition fence, the proprietor of the fence may maintain an action of contract for such value, and the costs of ascertaining the same; but the occupant or owner of unenclosed land on the island of Nantucket, used for depasturing only, shall not be subject to the foregoing provisions of this section.

SECT. 14. Where the line upon which a partition fence is to be made or divided is the boundary line of one or more cities or towns, or partly in one and partly in another, a fence viewer shall be taken from each place.

SECT. 15. When a water fence, or fence running into the water, is necessary to be made, the same shall be done in equal shares unless otherwise agreed by the parties; and in case either party refuses or neglects to make or maintain the share to him belonging, similar proceedings shall be had as in other cases of the like kind respecting other fences before mentioned.

SECT. 16. Any fence viewer, duly chosen and sworn, who, when requested, unreasonably neglects to view a fence, or to perform any other duties required of him in this chapter, shall forfeit five dollars, to be recovered by action of tort to the use of the place, or on complaint to the use of the Commonwealth, and he shall also be liable for all damages to the party injured.

SECT. 17. Each fence viewer shall be paid by the person employing him at the rate of two dollars a day for the time he is so employed; and if such person neglects to pay him within thirty days after the service

has been performed, he may recover in an action of tort double the amount of such fees.

Pounds and Impounding of Cattle; Field Drivers.

SECT. 18. Each city and town shall at its own expense, and in such places therein as the city council of the city or the inhabitants of the town direct, maintain one or more sufficient pounds. A city or town that for three months neglects to provide or maintain a sufficient pound, shall forfeit fifty dollars.

SECT. 19. Whoever wilfully injures a city or town pound shall be punished by fine not exceeding fifty dollars or by imprisonment in the common jail not exceeding ninety days.

SECT. 20. Each city and town shall annually appoint a suitable keeper of each pound therein.

SECT. 21. Every field driver, within his city or town, shall take up at any time swine, sheep, horses, asses, mules, goats, or neat cattle, going at large in the public highways or townways, or on common and unimproved lands, and not under the care of a keeper; and for any such cattle or beasts, so going at large on the Lord's day, the field driver or any other inhabitant of the city or town may, in an action of tort, recover for each beast the same fees which the field driver is entitled to receive for like beasts when distrained and impounded.

SECT. 22. When beasts are so taken up and distrained by a field driver, they shall be forthwith impounded in the city or town pound, and the keeper shall furnish them with suitable food and water while they are detained in his custody.

SECT. 23. The field driver shall be entitled to fifty cents per head for horses, asses, mules, and neat cattle, and ten cents per head for sheep, goats and swine so taken up by him, and the pound keeper shall be entitled to four cents per head for the animals so impounded; but if more than ten sheep are taken up at the same time, the fees for all above that number shall be only one-half of the above fees.

SECT. 24. The pound keeper shall not deliver to the owner any beasts so impounded until the owner pays him his fees, the expense of keeping the beasts, and the fees of the field driver, which latter, when received, he shall pay to the field driver.

SECT. 25. When a person is injured in his land by sheep, swine, horses, asses, mules, goats, or neat cattle, he may recover his damages in an action of tort against the owner of the beasts, or by distraining the beasts doing the damage, and proceeding therewith as hereinafter directed; but if the beasts were lawfully on the adjoining lands, and escape therefrom in consequence of the neglect of the person who suffered the damage to maintain his part of the division fence, the owner of the beasts shall not be liable for such damage.

SECT. 26. The beasts so distrained for doing damage shall be impounded in the city or town pound, or in some suitable place, under the immediate care and inspection of the person who distrained them, and he shall furnish them with suitable food and water while they remain impounded.

SECT. 27. If the beasts are impounded in the city or town pound, the distrainer shall leave with the pound keeper a memorandum in

writing, under his hand, stating the cause of impounding and the sum that he demands from the owner for the damage done by the beasts, and also for the daily charges of feeding them; and if they are impounded in any other place, he shall give a like memorandum to the owner of the beasts if demanded by him.

SECT. 28. The pound keeper, when the beasts are in his custody, shall not deliver them to the owner until the owner pays him his fees, the sum so demanded by the distrainer for the damages and charges aforesaid, the expense of advertising the beasts, if they are advertised, and all other legal costs and expenses.

SECT. 29. When beasts are impounded, the person impounding them shall within twenty-four hours thereafter give notice thereof in writing to the owner or person having the care of them, if known and living within six miles from the place of impounding, which notice shall be delivered to the party or left at his place of abode, and shall contain a description of the beasts and a statement of the time, place, and cause, of impounding.

SECT. 30. If there is no person entitled to notice according to the provisions of the preceding section, the person impounding the beasts shall within forty-eight hours thereafter cause to be posted in some public place in the city or town, and in a public place in each of any two adjoining cities or towns, if within four miles from the place where they were taken, a written notice containing a description of the beasts and a statement of the time, place, and cause of impounding them; and in such case, if the value of the beasts exceeds thirty dollars, and if no person appears to claim them within seven days after the day of impounding, a like notice shall be published three weeks successively in some public newspaper if there is any published within twenty miles from the place of impounding, the first publication to be within fifteen days after the day of impounding.

SECT. 31. If the owner or keeper of the beasts is dissatisfied with the claim of the person impounding them, he may have the amount for which he is liable ascertained and determined by two disinterested and discreet persons, to be appointed and sworn for that purpose by a justice of the peace or by the city or town clerk; and the sum so determined by them shall be received instead of the sum demanded by the person who impounded the beasts, and they shall thereupon be delivered to the owner or keeper thereof.

SECT. 32. If the sum for which the beasts are impounded and detained is not paid within fourteen days after notice of the impounding has been given as before directed, or after the last publication of such notice in a newspaper, the person who impounded them shall apply to a justice of the peace, or to the city or town clerk, and obtain a warrant to two disinterested and discreet persons, to be appointed and sworn by the justice or clerk, and the persons so appointed shall ascertain and determine the sum, due from the owner or keeper of the beasts for the damages, costs and expenses, for which they are impounded and detained, including a reasonable compensation for their own services.

SECT. 33. If the sum so found to be due is not forthwith paid, the person who impounded the beasts shall cause them to be sold by auction, in the city or town where they are impounded, first advertising the sale by posting up a notice thereof twenty-four hours before hand at some public place in the same city or town.

SECT. 34. The proceeds of such sale after paying all said damages, costs, expenses, and charges for advertising and selling the beasts, shall be deposited in the treasury of the city or town, for the use of the owner of the beasts, in case he substantiates his claim thereto within two years from the sale.

SECT. 35. If the beasts lawfully distrained or impounded escape or are rescued, the pound keeper, field driver, or other person, who distrained them, may at any time within seven days thereafter retake the beasts and hold and dispose thereof as if no such escape or rescue had taken place.

SECT. 36. Whoever rescues beasts lawfully distrained or impounded for any cause whatever, shall be liable in an action of tort brought by any person injured to pay all damages which such person sustains thereby, and the fees and charges incurred before the rescue; and he shall also forfeit a sum not less than five nor more than twenty dollars, to be recovered by complaint.

SECT. 37. The defendant in an action brought for rescuing beasts distrained or impounded shall not be allowed to allege or give in evidence the insufficiency of the fences, or any other fact or circumstance to show that the distress or impounding was illegal; but if there is such ground of objection to the proceeding of which he is entitled to avail himself, he may have the advantage thereof in an action of replevin.

SECT. 38. If the owner of a ram or he goat suffers it to go at large out of his enclosure between the first day of July and the twenty-fifth day of December, he shall forfeit five dollars for each offence, if prosecuted within thirty days next after such ram or he goat is found going at large, to be recovered on complaint in the county in which such owner lives.

CHAPTER 82.

OF THE PRESERVATION OF CERTAIN BIRDS AND ANIMALS.

SECTION 1. Whoever between the first day of March, and the first day of September takes, kills, or destroys, any of the birds called partridges or quails; or between the first day of March and the fourth day of July takes, kills, or destroys, any of the birds called woodcock; or at any season of the year takes, kills, or destroys, any of the birds called robins, thrushes, linnets, sparrows, bluebirds, bobolinks, yellow-birds, woodpeckers, or warblers; or within the respective times aforesaid sells, buys, or has in his possession, any of said birds taken or killed in this state or elsewhere, shall forfeit for every such partridge, quail, or woodcock, five dollars, and for every other of said birds, two dollars.

SECT. 2. Whoever at any season of the year takes, kills, or destroys, by means of traps or snares, any of the birds mentioned in the preceding section, except partridges, shall forfeit for every such bird so taken, killed, or destroyed, five dollars.

SECT. 3. The mayor and aldermen and selectmen of the several cities and towns shall cause the provisions of the preceding sections to be enforced in their respective places.

SECT. 4. Whoever between the first day of March and the fourth day of July shoots at or kills any birds upon lands not owned or occupied by himself, and without license from the owner or occupant thereof, shall forfeit to the owner or occupant ten dollars, in addition to the actual damages sustained, to be recovered in an action of tort.

SECT. 5. Whoever between the first day of March and the first day of July takes or kills any birds on any salt marshes, or sells any birds so taken or killed, shall forfeit two dollars for every offence: *provided*, that nothing contained in this section shall prevent the owner or occupant of such lands from taking or killing birds on the land so owned or held by him.

SECT. 6. Whoever within this state takes, kills, or destroys, any of the birds called grouse or heath hens, or sells, buys, or has in his possession, any of said birds so killed or taken, shall forfeit for every such bird twenty dollars.

SECT. 7. Whoever kills any grouse or heath hen as aforesaid, upon lands not owned or occupied by himself, and without license from the owner or occupant thereof, shall for each bird so killed forfeit to such occupant or owner ten dollars, in addition to the actual damage sustained, to be recovered in an action of tort.

SECT. 8. When a person is suspected of having in his possession grouse or heath hen taken or killed contrary to the provisions of this chapter, a justice of the peace, or police court, on complaint on oath before him, may issue his warrant directed to the proper officer to search for the same, and the same proceedings may be had as are provided in chapter one hundred and seventy relating to searches and seizures.

SECT. 9. The provisions of the preceding sections shall not extend to any city in which the city council, nor to any town in which the inhabitants at their annual meeting, in any year vote to suspend the operation thereof, in whole or in part, and for such term of time not exceeding one year as they deem expedient.

SECT. 10. Whoever between the hour of sunset and one hour before the sun's rising, on any day between the twentieth day of April and the first day of July, takes, confines, kills, or destroys, any of the birds called plover, curlew, dough bird, or chicken bird, shall for every such bird so taken, confined, killed, or destroyed, forfeit one dollar.

SECT. 11. Whoever at any time kills or destroys any of the birds mentioned in the preceding section, by the use of any other means or implements than such as are usually employed in fowling or killing wild game, shall for every such offence be liable to the penalty mentioned in said section.

SECT. 12. Whoever between the first day of January and the first day of August kills or hunts any deer, except his own tame deer or deer kept in his park or on his own land, shall for every such offence forfeit twenty dollars.

SECT. 13. Whoever at any time of the year hunts, chases, or kills, with hounds or dogs, any deer within the counties of Plymouth or Barnstable, shall for every such offence forfeit twenty dollars.

CHAPTER 88.

Protection of Sheep, Lambs, and other Domestic Animals, against Dogs.

SECT. 52. Every owner or keeper of a dog shall annually on or before the thirtieth day of April, cause it to be registered, numbered, described and licensed for one year from the first day of the ensuing May, in the office of the clerk of the city or town wherein he resides; and shall cause it to wear round its neck a collar distinctly marked with its owner's name and registered number, and shall pay for such license one dollar for a male dog and five dollars for a female dog.

SECT. 53. The clerk shall issue the license, and receive and pay the money therefor into the city or town treasury, retaining to his own use ten cents for each license. The treasurer shall keep an accurate and separate account of all sums received and paid out under the provisions of this chapter relating to dogs, which account shall at all times be open to the inspection of any voter of the place.

SECT. 54. The clerk shall annually, within one week after the first day of May, post in some conspicuous public place a list of all dogs licensed for the current year; and shall furnish a copy thereof to the chief of police of the city, or one of the constables of the town; and shall also, from time to time, furnish said officers with a list of such dogs as are subsequently licensed during the year.

SECT. 55. Any owner of a dog may at any time have it licensed until the first day of the ensuing May, upon paying the sum as provided in section fifty-two; but such license shall not exempt him from the penalty of the following section, on complaint made prior to issuing the license. No new license for the current year shall be necessary upon the removal of a licensed dog into another city or town, unless required by some by-law passed under section sixty-seven.

SECT. 56. Whoever keeps a dog contrary to the provisions of this chapter shall forfeit ten dollars, to be recovered by complaint, to the use of the place wherein the dog is kept.

SECT. 57. Whoever wrongfully removes the collar from or steals a dog, licensed and collared as aforesaid, shall be punished by fine not exceeding fifty dollars; and whoever wrongfully kills, maims, entices, or carries away such a dog, shall be liable to its owner for its value in an action of tort. Whoever distributes or exposes any poisonous substance, with intent that the same shall be eaten by any dog, shall be punished by fine not exceeding fifty nor less than ten dollars.

SECT. 58. Any person may, and every police officer and constable shall, kill or cause to be destroyed all dogs going at large and not licensed and collared according to the provisions of this chapter; and such officers, when not otherwise paid for their services, shall receive from the city or town treasury fifty cents for each dog so destroyed by them.

SECT. 59. Every owner or keeper of a dog shall forfeit to any person injured by it double the amount of the damage sustained by him, to be recovered in an action of tort.

SECT. 60. Any person may kill a dog that shall suddenly assault him while he is peaceably walking or riding without the enclosure of its

owner or keeper; and any person may kill a dog that is found out of the enclosure or immediate care of its owner or keeper, worrying, wounding, or killing any neat cattle, sheep or lambs.

SECT. 61. If any person so assaulted, or finding a dog strolling out of the enclosure or immediate care of its owner or keeper, shall, within forty-eight hours after such assault or finding, make oath thereof before a justice of the peace or police court for the county, or before the clerk of the city or town where the owner of the dog dwells, and shall further swear that he suspects the dog to be dangerous or mischievous, and shall give notice thereof to its owner or keeper by delivering him a certificate of such oath signed by such justice or clerk, the owner or keeper shall forthwith kill or confine it; and if he neglects so to do for twenty-four hours after such notice, he shall forfeit ten dollars.

SECT. 62. If, after such notice, the dog is not killed or confined, but is again found strolling out of the enclosure or immediate care of its owner or keeper, any person may kill it.

SECT. 63. If a dog, after such notice to its owner or keeper, shall by such assault wound or cause to be wounded any person, or shall worry, wound, or kill any neat cattle, sheep or lambs, or do any other mischief, the owner or keeper shall be liable to pay to the person injured thereby treble damage, to be recovered in an action of tort.

SECT. 64. Whoever suffers loss by reason of the worrying, maiming, or killing of his sheep, lambs, or other domestic animals, by dogs, may, within thirty days after he knows of such loss, present proof thereof to the mayor or selectmen of the city or town wherein the damage is done; and thereupon said officers shall draw an order in favor of the owner upon the treasurer of said city or town for the amount of such loss. The treasurer shall register such orders at the time of their presentation, and annually on the first day of January pay them in full, if the gross amount received by his city or town under the provisions of this chapter relating to dogs, and not previously paid out, is sufficient therefor; otherwise he shall divide such amount *pro rata* among such orders, in full discharge thereof. After such order has been drawn, the city or town may in an action of tort recover against the keeper or owner of any dog concerned in doing the damage the full amount thereof.

SECT. 65. The owner of sheep, lambs, or other domestic animals, worried, maimed, or killed by dogs, shall have his election whether to proceed under the provisions of the preceding section or of sections sixty-one, sixty-two, and sixty-three; but having signified such election, by commencing a suit or obtaining an order, he shall not have the other remedy.

SECT. 66. The mayor and aldermen of each city, and the selectmen of each town, shall require all dogs not licensed and collared according to the foregoing provisions, to be destroyed, and shall enforce all penalties herein provided. Any officer refusing or neglecting to perform the duties herein imposed upon him, shall be punished by fine not exceeding twenty-five dollars, to be paid into the city or town treasury.

SECT. 67. The city council of any city, and the inhabitants of any town, may make such additional by-laws and regulations concerning the licensing and restraining of dogs, as they deem expedient, and may affix any penalties, not exceeding ten dollars, for any breach thereof; but such by-laws and regulations shall relate only to dogs owned or kept in

such city or town; and the annual fee required for a license shall in no case be more than one dollar in addition to the sum required by section fifty-two.

SECT. 68. All fines and penalties provided in the sixteen preceding sections may be recovered on complaint before any police court or trial justice in the county where the offence is committed.

CHAPTER 161.

OFFENCES AGAINST PROPERTY.

SECT. 5. Whoever wilfully and maliciously burns, or otherwise destroys, or injures, a pile or parcel of wood, boards, timber, or other lumber, or any fence, bars, or gate, or a stack of grain, hay, or other vegetable product, or any vegetable product severed from the soil and not stacked, or any standing trees, grain, grass, or other standing product of the soil, or the soil itself, of another, shall be punished by imprisonment in the state prison not exceeding five years, or by fine not exceeding five hundred dollars and imprisonment in the jail not exceeding one year.

SECT. 80. Whoever wilfully and maliciously kills, mains or disfigures any horses, cattle, or other beasts, of another person, or wilfully and maliciously administers poison to any such beasts, or exposes any poisonous substance, with intent that the same shall be taken or swallowed by them, shall be punished by imprisonment in the state prison not exceeding five years, or by fine not exceeding one thousand dollars and imprisonment in the jail not exceeding one year.

SECT. 81. Whoever wilfully commits a trespass, by cutting down or destroying any timber or wood, standing or growing on the land of another, or by carrying away any kind of timber or wood, cut down or lying on such land, or by digging up or carrying away any stone, ore, gravel, clay, sand, turf, or mould, from such land, or any roots, fruit, or plant, there being, or by cutting down or carrying away any sedge, grass, hay, or any kind of corn, standing, growing or being on such land, or by carrying away from any wharf or landing place any goods whatever in which he has no interest or property, without the license of the owner thereof, shall be punished by imprisonment in the jail not exceeding sixty days, or by fine not exceeding fifty dollars.

SECT. 82. Whoever wilfully and maliciously, or wantonly and without cause, cuts down or destroys, or by girdling, lopping, or otherwise, injures any fruit or other tree, not his own, standing or growing for shade, ornament, or other useful purpose, or maliciously or wantonly breaks any glass, in a building not his own, or maliciously breaks down, injures, mars or defaces any fence belonging to or enclosing lands not his own, or maliciously throws down or opens any gate, bars or fence, and leaves the same down or open, or maliciously and injuriously severs from the freehold of another any produce thereof, or any thing attached thereto, shall be punished by imprisonment in the jail not exceeding one year, or by fine not exceeding one hundred dollars.

SECT. 83. Whoever wilfully and maliciously enters any orchard, nursery, garden, or cranberry meadow, and takes away, mutilates or

destroys any tree, shrub or vine, or steals, takes and carries away any fruit or flower, without the consent of the owner thereof, shall be punished by fine not exceeding one hundred dollars, or by imprisonment in the house of correction not exceeding three months.

SECT. 84. Whoever wilfully commits a trespass, by entering upon the garden, orchard, or other improved land, of another, without permission of the owner, and with intent to cut, take, carry away, destroy or injure the trees, grain, grass, hay, fruit or vegetables, there growing or being, shall be punished by imprisonment in the jail not exceeding thirty days, or by fine not exceeding twenty dollars; and if any of the offences mentioned in this or section eighty-one are committed on the Lord's day, or in disguise, or secretly in the night time, the imprisonment shall not be less than five days, nor the fine, less than five dollars.

SECT. 85. Whoever wilfully and maliciously destroys or injures the personal property of another in any manner or by any means not particularly described or mentioned in this chapter, shall be punished by imprisonment in the state prison not exceeding five years, or by fine not exceeding one thousand dollars and imprisonment in the jail not exceeding one year: *provided*, that when the value of the property so destroyed or injured is not alleged to exceed the sum of fifteen dollars, the punishment shall be by fine not exceeding fifteen dollars, or imprisonment in the jail not exceeding thirty days.

SECT. 86. Whoever is discovered in the act of wilfully injuring any fruit or forest trees, or committing any kind of malicious mischief on the Lord's day, may be arrested by any sheriff, deputy-sheriff, constable, watchman, police officer, or other person, and lawfully detained by imprisonment in the jail or otherwise, until a complaint can be made against him for the offence for which he was arrested, and he be taken upon a warrant issued upon such complaint; but such detention without warrant shall not continue more than twenty-four hours.

SECT. 87. Whoever wilfully commits any trespass by killing pigeons on, or frightening them from, beds made for the purpose of taking them in nets, by firing guns, or in any other manner, within one hundred rods of the same, except on lands lawfully occupied by himself, shall be punished by imprisonment in the jail not exceeding thirty days, or by fine not exceeding twenty dollars; and shall also be liable for the actual damages to the owner or occupant of such beds.

ABSTRACT OF CHAPTER 49,

RELATING TO THE SALE OF VARIOUS FARM PRODUCE.

Section 61. Fruits, nuts and vegetables to be measured by dry measure.

Section 62. Chestnuts, walnuts, cranberries and all other berries by the strike measure.

Section 63. All grain and meal, excepting oatmeal, by the bushel.

Section 64. A bushel of wheat, 60 pounds; corn or rye, 56 pounds; oats, 32 pounds; barley or buckwheat, 48 pounds; cracked corn, or meal of any kind excepting oatmeal, 50 pounds avoirdupois.

Section 76. Pressed hay shall be branded with the initials and whole surname of the person pressing it, and the name of the city or town where it is pressed.

Section 80. Hay which is sweet, of good quality, and free from damage or improper mixture shall be marked by the inspector (No. 1.) Hay which is of a secondary quality, marked (No. 2.) Hay which is wet, or otherwise damaged, or mixed with straw or other substances not so valuable as hay, to be marked (*bad.*)

Section 91. Hops to be in square bags or pockets, each bag 400 pounds, each pocket 200 pounds, (as near as may be.)

Section 92. "No hops shall be deemed merchantable unless they have been well picked, are free from stems and leaves, and properly kiln-dried." The bags or pockets to be of such strength and texture as to preserve the hops from damage, and receive the marks of the cultivator and inspector, and shall be marked with the name and residence of the cultivator.

Section 150. All measures, cans or other vessels used in the sale or buying at wholesale of milk, shall be annually sealed by the sealer of weights and measures, by wine measure, and marked with figures showing their capacity.

Section 180. Potatoes shall weigh 60 pounds, onions 52 pounds, and salt 70 pounds per bushel. In order to ascertain the average, the seller shall weigh at least ten measures in every hundred bushels, five in fifty, and two in every quantity less than fifty.

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